IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

PHOTOFACT* FOLDER SET

*TRADE MARK

NO. 74

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The PHOTOFACT Servicer

October 15, 1949 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ Vol. 8, Nos. 73 & 74

A DIAL CORD KNOT THAT WORKS

J. P. Ethridge, of Louisville, Georgia, has developed an ingenious, dependable, dial cord knot that really works. He has been kind enough to permit us to pass his idea on to you.

His suggestion was beautifully presented on a neat and practical demonstration board. A photograph of this board will enable you to try out his instructions, which follow:

"Remove staples at A.

"Pull knot B up to spring and tighten until the usual tension is on spring. Release cord and you will find the knot locks. In actual practice you can then turn dial knob back and forth until the slack is taken up, then tighten the knot until the correct tension is reached.

"Remove staples at C and bring D, which is the other half of the square knot, up and tighten. A touch of cement will finish the job.

"It is twice as effective and takes half the time, and in some cases where the knot must be tied in a close place it is the only knot that will do a workmanlike job."

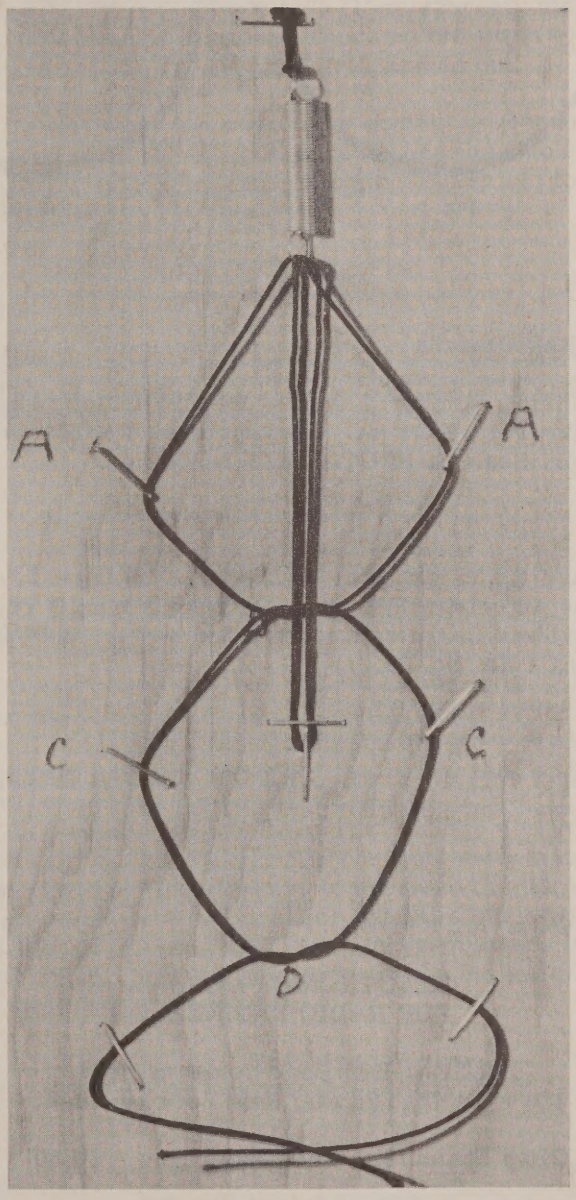


Fig. 1

"In using the knot I have found some ways to facilitate its use.

"Figure 2 is in case of a slot in the drum. The eye of the spring is hooked between the two ends of the cord on each side of the cross-over. The cross can then be brought down through the slot where the other end of spring can be hooked to drum.

"Figure 3 is in case of an eye in the drum. The cross-over can be formed by separating the cord with the fingers. The operation is completed as in Figure 1.

"Figure 4 is a case where some part, as a dial plate bracket, is in front of the drum. After the cord is hooked into eye of spring, use a forked tool and hook spring to drum. In some cases it is best to use a hook and pull spring in from other side."

FIG. 2

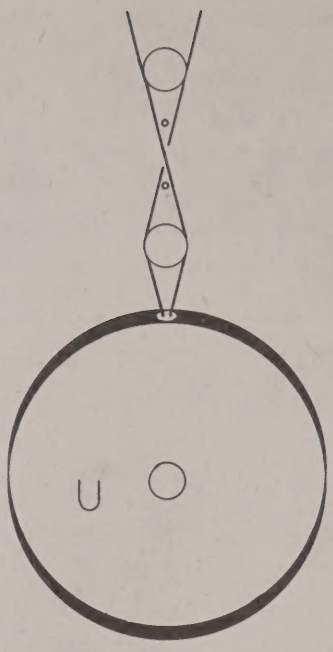


FIG. 3

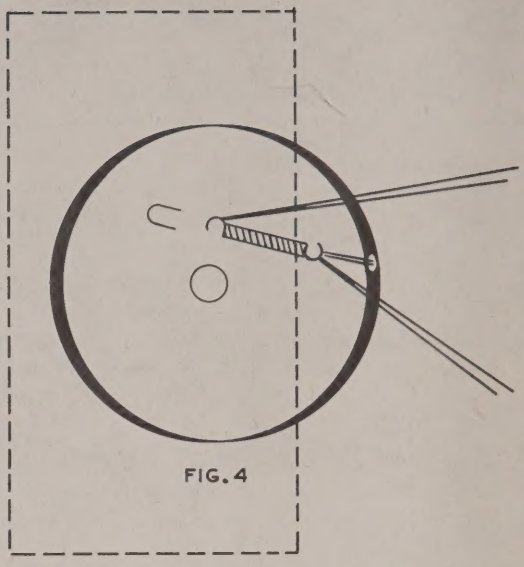


FIG. 4

REMINDERS -

Volume Number Labels - are available to regular PHOTOFACT Subscribers FREE. See Certificate in PHOTOFACT Set No. 62.

* * *

Save $0.75 on your purchase of Volume 2, of the Automatic Record Changer Manual. This dividend Certificate is included with PHOTOFACT Set No. 52.

* * *

Don't forget to place the TV Folders in their proper envelopes.

* * *

BOOK REVIEW -

ELECTRONICS MANUAL
FOR RADIO ENGINEERS

McGraw-Hill Book Company, Inc.,
330 West 42nd Street, New York 18, N. Y.

Cloth Bound; 8-1/2x11; 879 pages - $9.50

289 articles published in Electronics during 1940-48 are brought together here for quick reference.

The material is thoroughly cross-indexed, and may save hours and days of research through technical literature. It reduces to a minimum duplicative laboratory research and experimentation.

* * *

FIELD EXPERIENCES -

Please Note:

The demand for Television SERVICE NOTES is - URGENT - send yours in and get your set of PHOTOFACTS Free.

For every service "Field Experience" published, we issue a certificate good for one PHOTOFACT Folder Set. Awards are issued at the time of publication. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or for the results obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Co., Inc.

* * *

OLDSMOBILE Model 982420
Photofact Set No. 57, Folder No. 12

Complaint: "Noisy" push buttons. Replacing a 7E6 did not correct the problem. The slightest jar on the push button assembly would cause a popping noise in the speaker.

Remedy: Trouble was traced to loose shield

cans around the RF coils. Soldering the cans to the metal base supporting the coils eliminated the noise.

Submitted by: J. R. Nakken,
c/o Epperson's, Court and College Sts.,
Woodland, California

* * *

FORD Model 8MF880
Photofact Set No. 42, Folder No. 12

Complaint: Set cuts in and out.

Cause: PHOTOFACT item No. 95, the Audio Shorting Switch in the push button tuning assembly sticks, because the rivet in the pivot of the shorting switch arm binds.

Remedy: Drill out the rivet and replace with a small bolt with spring washers between, to keep it snug. Then solder the nut to the bolt so it will not jiggle loose.

Submitted by: Alvin H. Pudelko's
Radio Service
Snover, Mich.

* * *

PHILCO Model 46-1201 Revised
Photofact Set No. 29, Folder No. 21

Complaint: Hum and distortion.

Remedy: Check 80 ohm candohm filament dropping resistor which shorts out to chassis which is not common ground.

Submitted by: R. W. Smith
408 Wilson Ave., Brooklyn, N. Y.

* * *

FADA Model 1000
Photofact Set No. 1, Folder No. 7

Complaint: Developed a hum that came after one or two hours of use. Increased in volume until it blotted out the signal.

Remedy: Every common offender checked okay. Speaker is mounted directly over the 35B5 and 35W4. These so heated the speaker that it affected the movement of the voice coil.

I cemented some asbestos paper on bright metal. I bolted the metal to the chassis, bright side to the tube, the asbestos away from the tube, and bent it over the top of the tube to make a reflector and insulator. I replaced the speaker because it was permanently damaged by the heat. I have had no complaints since.

Submitted by: Calvin Gregg,
1238 Palo Alto St., Pittsburgh 12, Pa.

* * *

TRANSVISION Television Kit Model 10BL
(- - - Kits sometimes Need Service too - - -)

Complaint: The top half of the picture bent to the left horizontally on all channels.

Remedy: Making sure that all controls were properly set and checking all components did not disclose the trouble. Touching the leads to the video tube, the picture straightened out.

Shielding the video tube control grid lead by wrapping No. 24 coil wire around the whole length of this lead and grounding the shield to chassis cured this trouble.

Submitted by: V. J. Paradise
6122 Glenmore Ave., Philadelphia 42, Pa.

(Editor's Note: This again stresses the necessity of watching "lead-dress" in working with all TV receiver assemblies.)

* * *

WEBSTER Model 80 Wire Recorder
Volume No. 2, Howard W. Sams
Record Changer Manual
Photofact Set No. 37, Folder 6

Complaint: Neon lamp stays lit.

Remedy: Some of the NE-51 lamps have abnormally low striking voltages. Their extinction voltage characteristics are far from uniform. In all cases of this sort, the lamp will remain lighted although the 1 meg and 220K resistor which form its voltage divider are correct in value. To correct, determine the signal level necessary to overload the wire, then shunt the 220K resistor until the lamp will flicker at between half and three-quarters of this value. This is not factory data but seems to work satisfactorily.

Submitted by: Francis C. Wolven,
R. F. D. 2, Box 178, Saugerties, N. Y.

* * *

PHILCO Model 46-250
Photofact Set No. 2, Folder No. 12

Complaint: Intermittent hum and distortion.

Cause and Remedy: Filter Condenser (Item

No. 6) was not flush with bottom of chassis. When chassis securing screw was tightened, pressure applied on the condenser pushed the condenser against the socket lugs of 7C6. In due time this pressure will puncture the condenser, shorting it.

When chassis was taken out of cabinet for repair, pressure was relieved on condenser and hum and distortion disappeared. Complaint will only be found by pressing on condenser to simulate conditions as in chassis. I have had four cases.

Submitted by King's Radio Shop,
Box 34, Locke, Calif.

* * *

ZENITH Model 7H822
Photofact Set No. 55, Folder No. 25

Complaint: Strong oscillation of converter stage over entire dial.

Cause: The IF transformers are combination FM-AM units with small fixed capacitors across each of the four coils. These units use small metal stampings as connectors between the coils and the soldering lugs. Halfway up a metal finger is stamped out of the stamping and bent over to make contact with the metal surface which forms one plate of a fixed condenser. One finger had broken off.

Remedy: A soft stranded wire was soldered from the stamping to replace the metal finger.

Submitted by: W. J. Taylor,
Welch, Minn.

* * *

MOTOROLA Record Changer RC-30A
Volume No. 2, Howard W. Sams
Record Changer Manual

Complaint: Changer keeps cycling.

Remedy: After trying all the suggested service hints, with no results, we took the changer apart to examine the latch arm assembly and found that the notch in the Bell crank lever assembly arm (Part No. 52) was worn until it would not hold the trip arm. We filed the notch deeper and the changer worked perfectly.

Submitted by: LeRoy Ragsdale,
Modern Radio Sales & Service,
2114 Rogers Ave., Ft. Smith, Ark.

MOTOROLA TV Model VT-71
Photofact Set No. 55, Folder No. 16

Complaint: Raster "jumping" in the vertical plane, similar to oscillation; not able to synchronize the image in any position; out of focus.

Cause: One of the 2.2 meg resistors in the string R80, R81, R82, R83, R84, has increased in value, usually R84, connected between R4 and R5 centering controls. (Some receivers use .7 meg resistors instead of all being 2.2 meg.)

Remedy: To alleviate over-loads and flash-overs in this circuit, I eliminate the tie-lugs mounted on the centering controls. Mount the components directly and allow them to "float" without being connected to the tie-lugs.

Submitted by: Horace D. Westbrooks
117 West Solomon Street, Griffin, Ga,

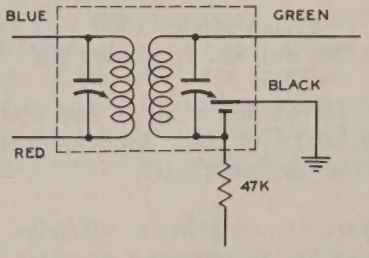
(Editor's Note: Also check the condition of the horizontal and vertical coupling capacitors when this arcing occurs.)

* * *

MANTOLA Model R76262 (7160-17)
Photofact Set No. 51, Folder No. 12

Complaint: Phonograph volume O. K. Radio volume weak. Volume control had no effect on radio.

Cause: The set uses two A. V. C. RF by-pass condensers mounted on the low side of the last IF transformer secondary trimmer condenser. A reading of 25 ohms was read between green lead and black lead ground. This showed the A. V. C. condenser was shorting out, grounding the low side of the secondary winding.

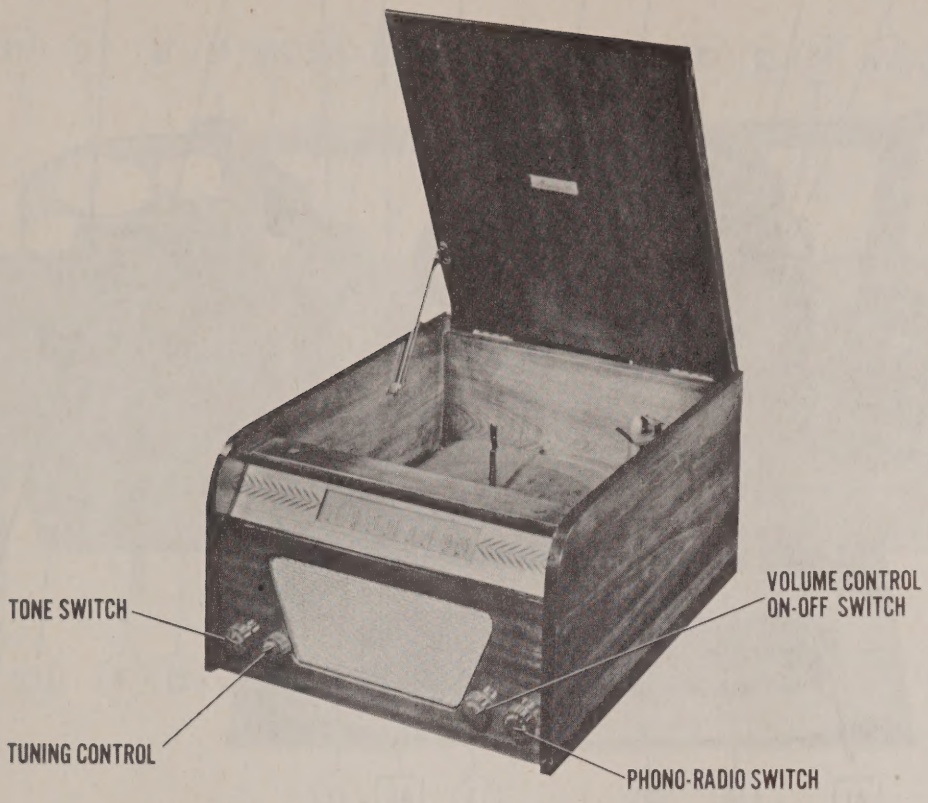


Remedy: I repaired the above by inserting one 100 MFD. mica condenser in series with the black lead to ground. I also inserted one from lower A. V. C. plate to ground. I believe this is the most satisfactory repair for this trouble.

Submitted by: Glen A. Brink, Paramount
Radio Company,
Boulder, Colorado

AIRCASTLE MODEL 6050

AIRCASTLE MODEL 6050



AIRCASTLE MODEL 6050

TRADE NAME	Aircastle, Model 6050
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Illinois.
TYPE SET	AC Operated Combination Phono-Radio, Superheterodyne Receiver with Loop Antenna.
TUBES (FIVE)	Types 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT DET-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-125 Volts AC RATING .32 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1720KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning gang fully open and set pointer 1 9/16 inches from left hand edge of dial backplate.

Use isolation transformer if available. If not connect a .1MFD cap. in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

If set is aligned without loop connected, connect 20,000Ω carbon resistor across loop connections on chassis. Replace set in cabinet and connect loop before doing step 3.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MF	High side to stator of rear section of tuning gang. Low side to B-.	455KC (400∿ Mod.)	Tuning gang fully closed.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001 MFD to reduce hum modulation.
2.	.05MF	"	1720KC (400∿ Mod.)	Tuning gang fully open.	"	A5	"
3.		Loop	1400KC (400∿ Mod.)	Tune for max. output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

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DATE 10/49 SET #74 FOLDER #1

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	12SA7GT	12SA7GT	8AD	
V2	IF Amp.	12SK7GT	12SK7GT	8N	
V3	DET-AVC-AF	12SQ7	12SQ7	8Q	
V4	Power Output	50L6GT	50L6GT	7AC	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	20	150	EC-14	PRSA150/40 -40	EZ 44315C*		TA-440	Filter-Yellow
B	40	150		PRS150/20			UT-201	Filter-Red
C	40	150						Filter-Blue
C2	.05	200	PC-2	P288-05	GT2S5		TM-15	AVC Filter
C3	50	500	MC-4	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Grid Cap
C4	.25	200	PC-4	P488-25	GT2P25		TC-2	Bias Filter
C5	100	500	MC-2	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C6	500		MC-5	1468-0005	5W5T5	GP2K-500	1FM-35	Tone Compensation
C7	.05	400	PC-5	P488-05	GT4S5		TM-15	Phono Isolation
C8	10000	300	PC-7	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C9	500		MC-5	1468-0005	5W5T5	GP2K-500	1FM-35	AF Plate Bypass
C10	10000	300	PC-7	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C11	10000	300	PC-7	P488-01	GT4S1	GP2-335-01	TM-11	Output Plate Bypass
C12	.05	400	PC-5	P488-05	GT4S5		TM-15	Rect. Plate Bypass
C13	.1	400	PC-8	P488-1	GT4P1		72P52	Line Isolation
C14	.05	400	PC-5	P488-05	GT4S5		TM-15	Tone Compensation

* Omit Bypass Section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	VC-4	Q13-137	AM-63-Z	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions

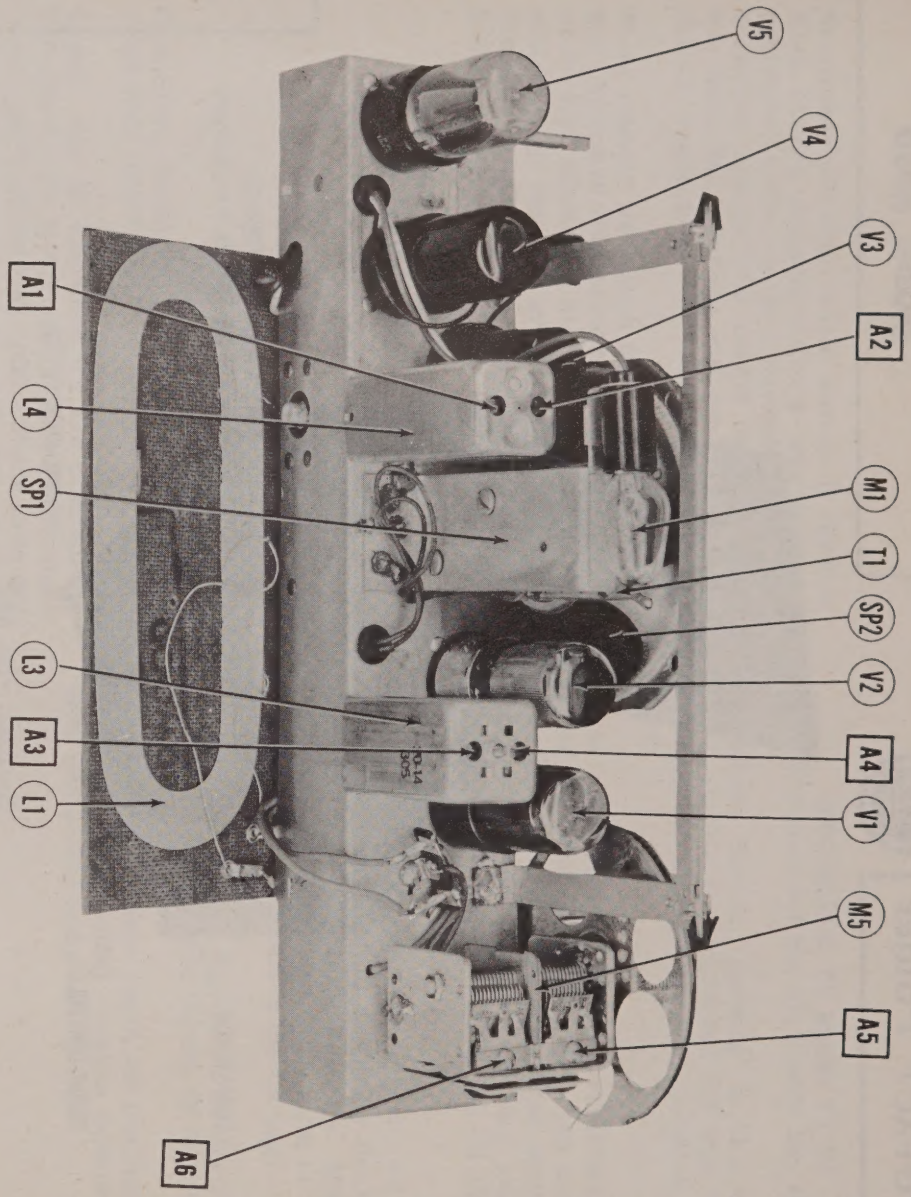
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	22KΩ	½	IR-9	BTS-22K	Osc. Grid
R3	47KΩ	½	IR-10	BTS-47K	Osc. Grid
R4	3.3 Meg.	½	IR-23	BTS-3.3 Meg.	AVC Network
R5	47KΩ	½	IR-10	BTS-47K	Diode Filter
R6	2.2 Meg.	½	IR-13	BTS-2.2 Meg.	AF Grid
R7	470KΩ	½	IR-11	BTS-470K	AF Plate
R8	470KΩ	½	IR-11	BTS-470K	Output Grid
R9	2200Ω	½	IR-15	BTS-2200	Tone Compensation
R10	470Ω	½	IR-1	BTS-470	Filter
R11	1000Ω	1	IR-42	BW-1-1000	Filter
R12	33Ω	½	IR-17		Surge Limiter
R13	33Ω	½	IR-17		Rect. Ballast
R14	220KΩ	½	IR-20	BTS-220K	Tone Compensation
R15	1 Meg.	½	IR-12	BTS-1 Meg.	Tone Compensation
R16	220KΩ	½	IR-20	BTS-220K	Isolation

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	2500Ω	3.5Ω	240Ω Tapped@ 6.5Ω	.5Ω		A-3330#	A-3031#	RO-3	# Bend Mtg. Tabs Down And Mount On Original Bracket

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V.C. IMP.		ST-105§†		† Remount Output Transformer
SP1	PM	3.5Ω	SPK-12	MOD.P5-X	5A07†	§ Drill & Tap Magnet Frame
	CONE DIA.	V.C. DIA.				
SP2	4 5/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA MEISSNER PART No.
L1	Loop Ant.		1.5Ω	LL-17	
L2	Osc.Coil	7.5Ω	.8Ω	LO-14	14-1060
L3	Input IF	32Ω	32Ω	LI-6	16-6658
L4	Output IF	28Ω	28Ω	LI-7	16-6667

DIAL LIGHTS

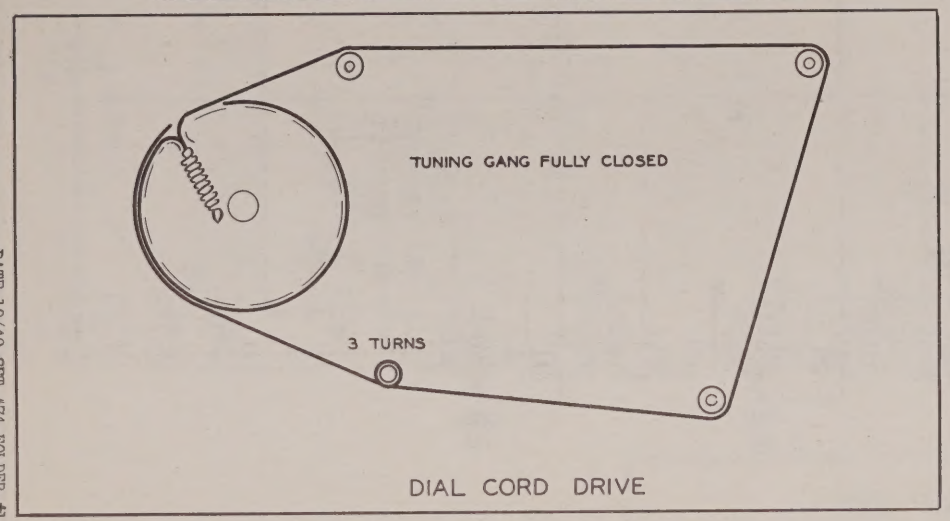
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA AIRCASTLE PART No.		NOTES
M1	Screw	115V			PB-2		120V 7W

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA ASTATIC PART No.	REMARKS
M2	S-1	LT-1M Or QT-3J	

MISCELLANEOUS

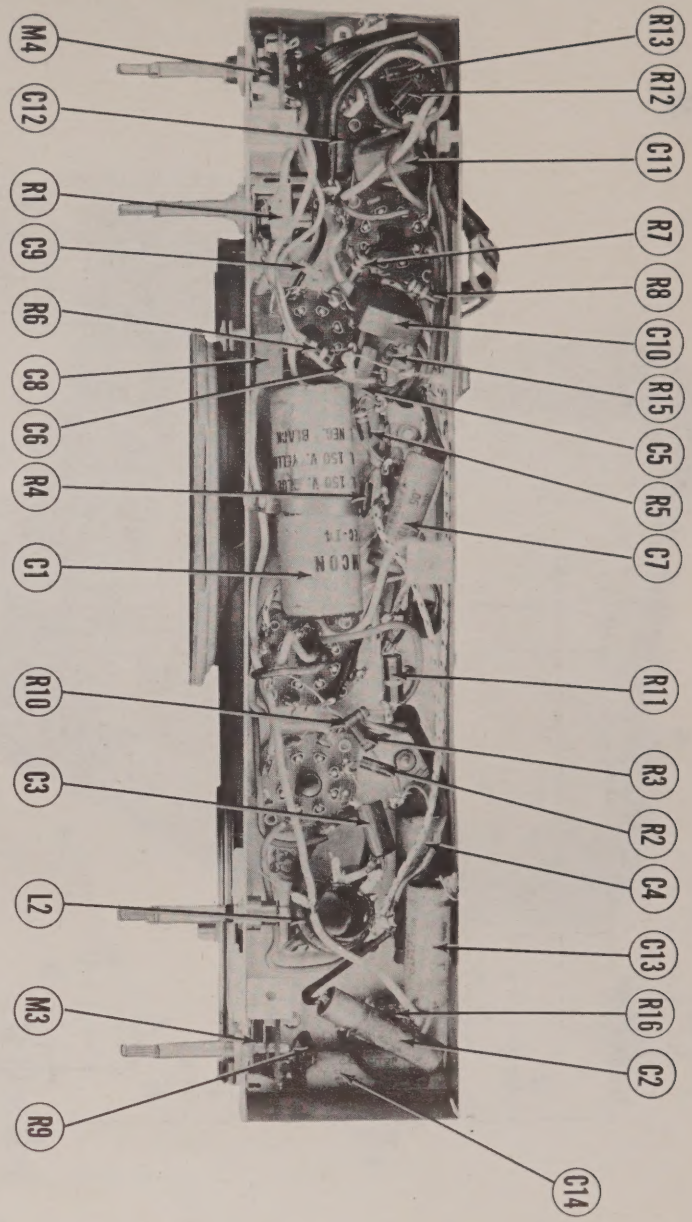
ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
M3	Switch	SW-2	Tone
M4	Switch	SW-1	Radio-Phono
M5	2 Gang Var.Cap.	GC-5	(25-490MMF, 31-225MMF)



DIAL CORD DRIVE

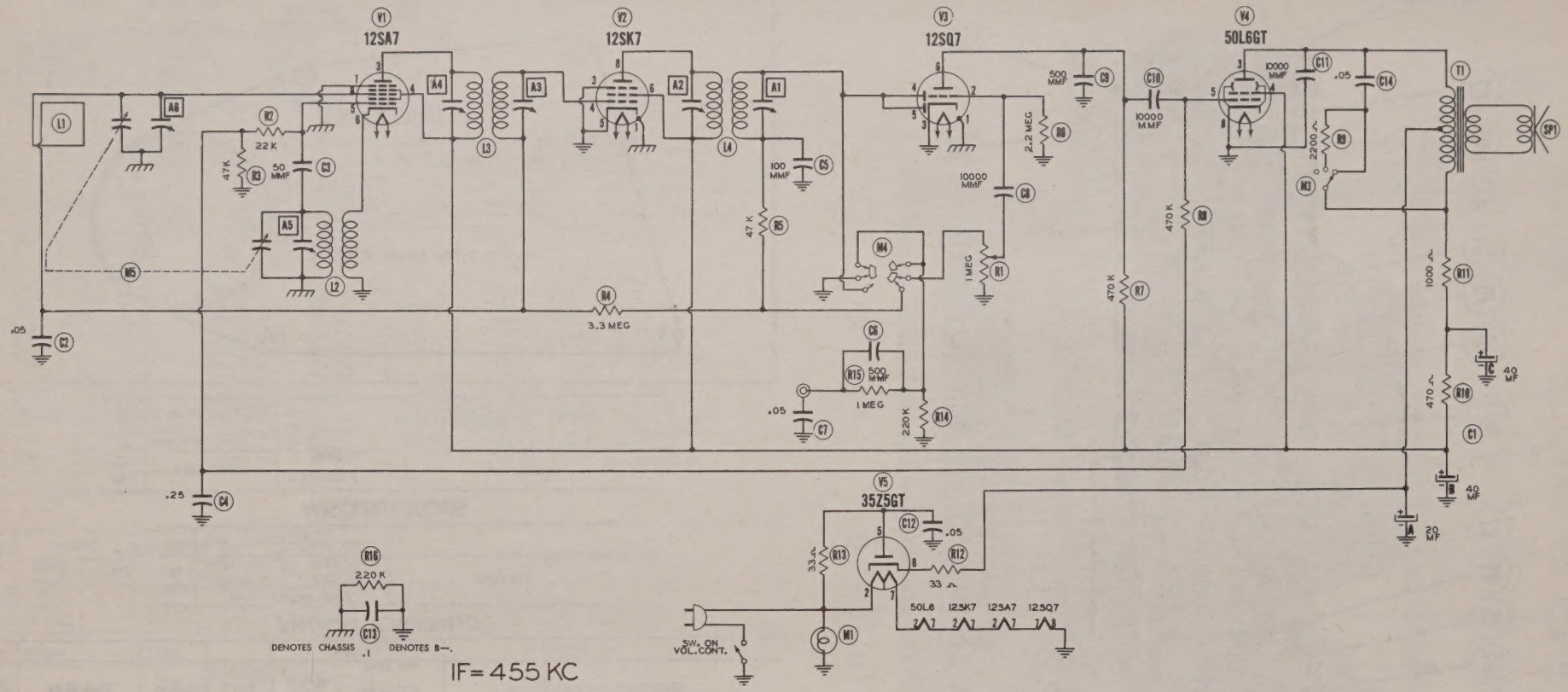
DATE 10/49 SET #74 FOLDER #1

CHASSIS—BOTTOM VIEW



AIRCASTLE MODEL 6050

AIRCASTLE MODEL 6050



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7	0V	24VAC	80VDC	80VDC	§-7.0 VDC	0V	12VAC	-.8VDC
V 2	12SK7	0V	38VAC	0V	-.8VDC	0V	80VDC	24VAC	80VDC
V 3	12SQ7	0V	-.5VDC	0V	-.5VDC	-.5VDC	37VDC	12VAC	0V
V 4	50L6	0V	85VAC	105VDC	80VDC	-1.5VDC	-5VDC	38VAC	0V
V 5	35Z5	0V	117VAC	110VAC	0V	115VAC	115VDC	85VAC	117VDC

§ Taken With Vacuum Tube Voltmeter.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7	220KΩ	24Ω	†1700Ω	†1700Ω	70KΩ	.5Ω	12Ω	4.5 Meg
V 2	12SK7	220KΩ	36Ω	0Ω	4.5 Meg	0Ω	†1700Ω	24Ω	†1700Ω
V 3	12SQ7	220KΩ	2.2 Meg	0Ω	1 Meg.	1 Meg.	†470KΩ	12Ω	0Ω
V 4	50L6	220KΩ	65Ω	†280Ω	†1700Ω	500KΩ	47KΩ	36Ω	0Ω
V 5	35Z5	220KΩ	90Ω	85Ω	Inf.	120Ω	†33Ω	65Ω	50KΩ

† Measured From Pin 8 Of V5.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DAVID BOGEN
MODELS 11X, 21X

DAVID BOGEN
MODELS 11X, 21X

TRADE NAME	David Bogen, Models 11X, 21X
MANUFACTURER	David Bogen Co., Inc., 663 Broadway, New York 12, New York
TYPE SET	AC Operated Intercommunication System
TUBES (THREE)	Types 6SL7GT AF Amp., 6Y6G Power Output, 6X5GT Rectifier
POWER SUPPLY	110-120 Volts AC RATING: .26 Amp. @ 117 Volts AC

SINGLE MASTER SYSTEM

Model 11X will handle any number of remotes up to 10 and model 21X any number of remotes up to 20. Connections will usually be made through a junction box (one for model 11X, two for model 21X). One twisted pair of wires from each remote station (not using break-in) connect to corresponding pair on master unit. (note pairs number 1 thru 10 on schematic). On remotes using break-in another twisted pair from the remote station connects to pair designated "BR" on master station. Note that schematic shows only model 11X. Model 21X employes another switch and cable which uses the same color code and the pairs would be designated 11 thru 20.

MULTIPLE MASTER SYSTEM

It is necessary to modify each unit before operating this system. Remove the bottom plate to expose the under part of the selector switch with the under part of the selector switch visible and the talk-listen switch farthest away, cut the "On Bus" wires between the last pair and the next to the last pair on the right end of selector switch. (See Schematic). Replace bottom plate on chassis and assemble in cabinet. Number stations from 1 up to number of stations used (Any number may be used up to 11 of models 11X or 21 or model 21X). Pairs of wires are then connected as follows: Pair "BM" of station No. 1 connects to pair No. 1 of all other stations; Pair "BM" of station NO. 2 connects to pair No. 1 on station No.1 and to pair No. 2 on all other stations; Pair "BM" of station 3 connects to pair No, 2 of stations 1 and 2 and pair No. 3 of all other stations, pair "BM" of station 4 connects to pair No. 3 of stations 1 and 2 and 3 and pair No. 4 of all other stations. Pair "BM" of station 5 connects to pair No. 4 of stations 1, 2, 3 and 4 and pair No. 5 of all other stations. This continues for each additional station used adding 1 pair of twisted wires for each additional station used. It will be noted that the "BM" pair on each station connects to corresponding pair number on each additional station and to preceeding pair number on each other stations. For example; "BM" pair of station 9 connects to pair 8 on stations 1 thru 8 and pair 9 on all other stations.

MULTIPLE MASTER-MULTIPLE REMOTE

Connect the master stations first as described above using pairs 1 thru number of master stations used. Then wire remotes starting with next pair as described under single master system. It is necessary to cut the "On Bus" wires as described in the multiple master system except the "On Bus" wires must be cut between the last master station pair and the first remote station pair used.

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DATE 10/49 SET #74 FOLDER #2

PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
MODEL 11X

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DAVID BOGEN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	6SL7GT	6SL7GT	8BD	
V2	Power Output	6Y6G	6Y6G	7AC	
V3	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DAVID BOGEN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	150		AF844D	UP43215		EL-224	◪ Filter
B	30	150						▲ Filter
C	10	150						Filter
C2	10	25		PRS25/10	BR102A		TVA-5	Output Plate Bypass Note
C3	.25	200		P488-25	GT2P25		TC-2	Bias Filter
C4	.001	600		P688-001	GT6D1	GP2L-001	TM-21	Audio Coupling
C5	.003	600		P688-003	GT6D3	GP2M-003	TM-23	Audio Coupling
C6	100	500		1468-0001	5W5T1	GP1K-100	1FM-31	AF Feedback
C7	.1	500		P688-1	GT6P1		TM-1	Line Filter

Note. Some models use 25MFD in this application.

CONTROLS

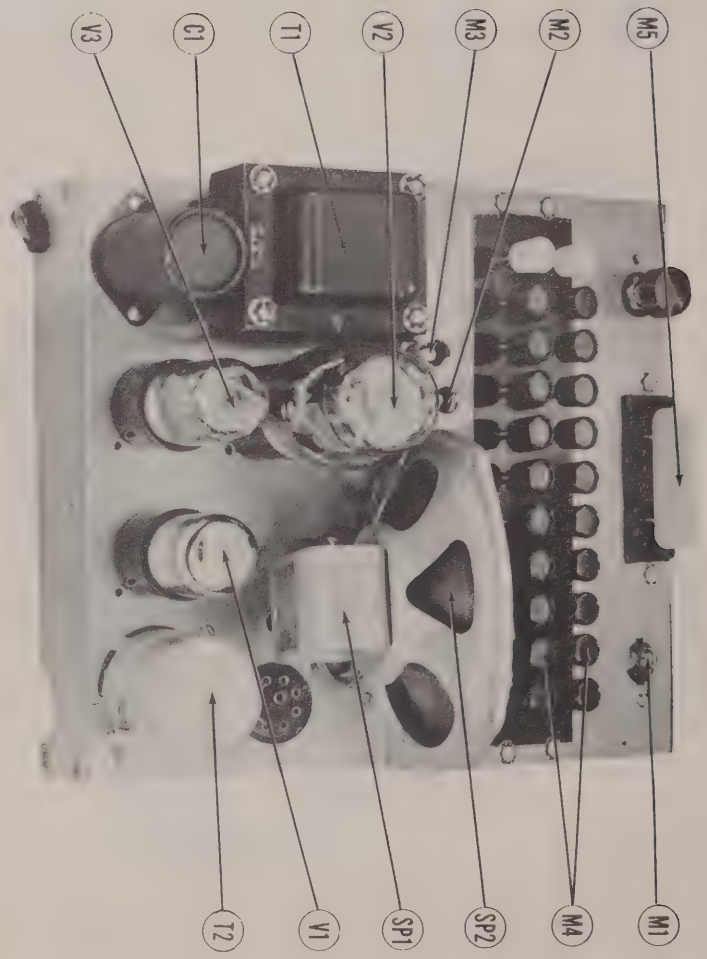
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: D. BOGEN PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1	300Ω	2			43S-300*	Volume control and switch (Wire Wound)

* Switch attached at factory.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DAVID BOGEN PART No.	IRC PART No.	IDENTIFICATION CODES
R2	220KΩ	½		BTS-220K	AF Amp. Grid
R3	470KΩ	½		BTS-470K	AF Amp. Grid
R4	220KΩ	½		BTS-220K	AF Plate
R5	220KΩ	½		BTS-220K	AF Grid
R6	1000Ω	½		BTS-1000	AF Cathode
R7	100KΩ	½		BTS-100K	AF Plate
R8	1 Meg.	½		BTS-1 Meg.	Feedback
R9	68KΩ	½		BTS-68K	Tone Compensation
R10	220KΩ	½		BTS-220K	Output Grid
R11	270Ω	2		BW-2-270	Output Cathode (Wire Wound)
R12	3300Ω	½		BTS-3300	Filter
R13	100Ω	½		BTS-100	Filter
R14	100Ω	½			Surge Limiter
R15	15Ω	½		BW-½-15	Series Handset
R16	100Ω	½		BW-½-100	Series Volume Control
R17	33Ω	½		BW-½-33	Input Transformer Shunt
R18	33Ω	½		BW-½-33	" " "
R19	47Ω	½		BW-½-47	" " "
R20	47Ω	½		BW-½-47	" " "
R21	47Ω	½		BW-½-47	" " "
R22	470Ω	½		BTS-470	Tone Compensation

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	DAVID BOGEN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .26A	310VDC .048ADC	6.3VAC @ 2.3A		T375BU	P-6348†		

† Add series resistor to reduce plate voltage and drill 2 mounting holes.

TRANSFORMER (INPUT)

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO PRI. TO SEC.	DC RES. PRI.	DC RES. SEC.	DAVID BOGEN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
T2	1 to 25	3Ω	950Ω	T120B		A-2926 ‡		‡ Drill new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE PRI.	IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.	DAVID BOGEN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
T3	5KΩ	47Ω	100Ω	2.8Ω	T277BU	A-3849	A-2902	RO-303	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DAVID BOGEN PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-740		
SP1	PM	47Ω		MOD.P5-X	#	# Supplied on order. Specify voice coil impedance.
	CONE DIA.	V. C. DIA.				
SP2	4 1/2"	9/16"				

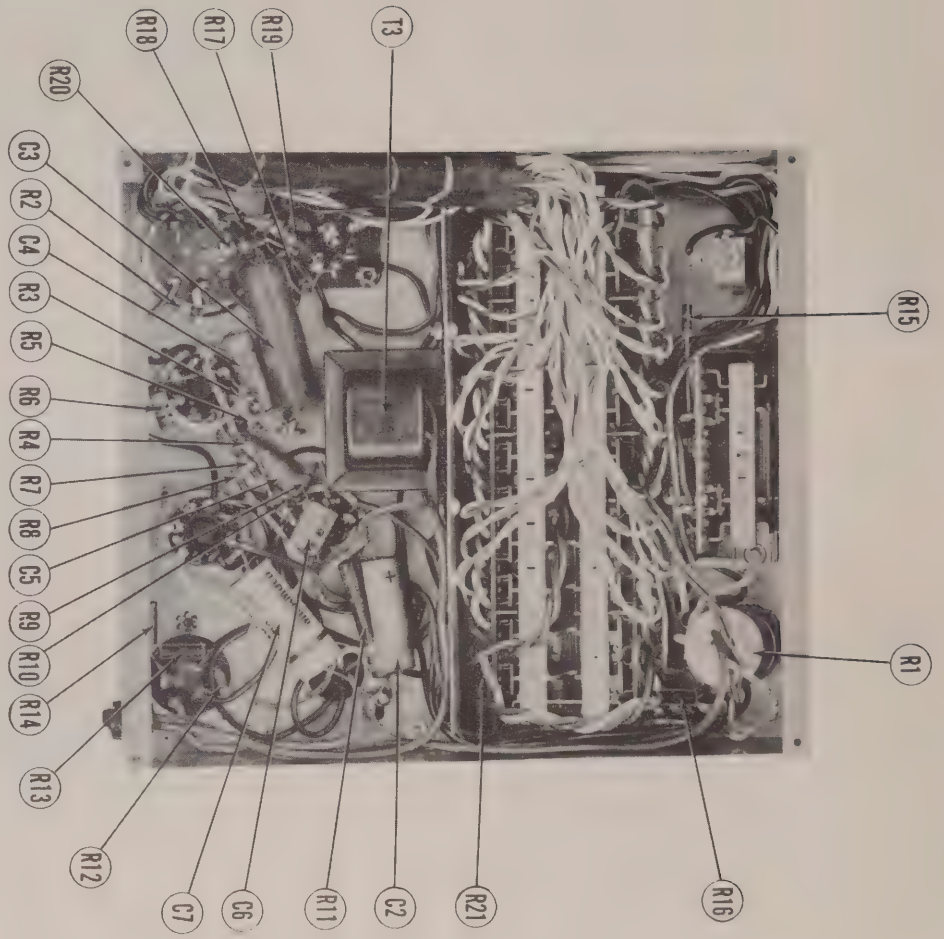
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					DAVID BOGEN PART No.		
M1	Bayonet	6-8	.15	Brown			Type #47
M2	Bayonet	2	.06	Pink			Type #49
M3	Bayonet	2	.06	Pink			Type #49

MISCELLANEOUS

ITEM No.	PART NAME	DAVID BOGEN PART No.	NOTES
M4	Switch		Pushbutton
M5	Switch		Talk-Listen

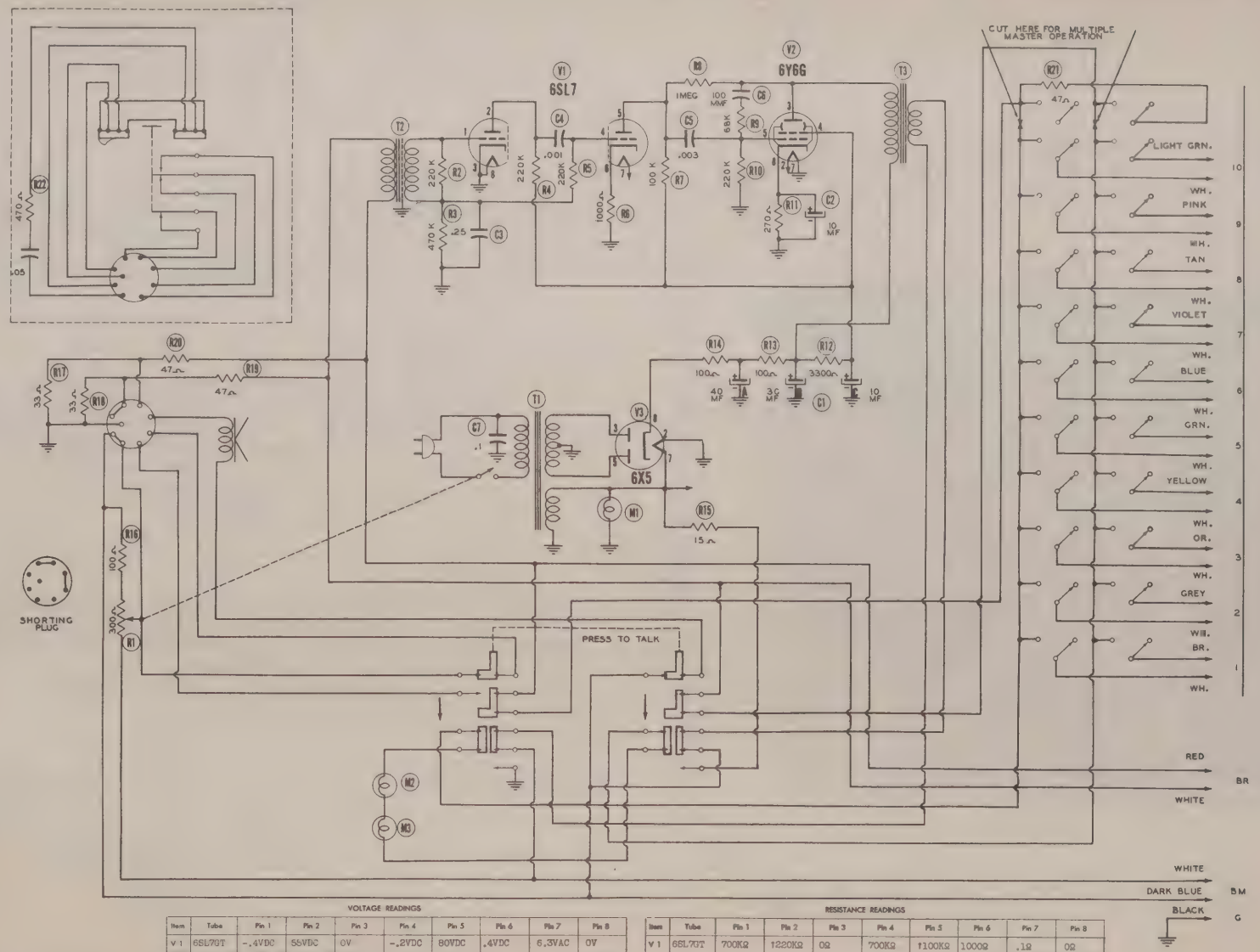
CHASSIS—BOTTOM VIEW



DATE 10/49 SET #74 FOLDER #2

DAVID BOGEN MODEL 11X

DAVID BOGEN MODEL 11X



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SL7GT	-.4VDC	55VDC	0V	-.2VDC	80VDC	.4VDC	6.3VAC	0V
V 2	6Y6G	0V	6.3VAC	130VDC	125VDC	0V	0V	0V	12VDC
V 3	6X5GT	0V	0V	148VAC	0V	145VAC	0V	6.3VAC	145VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SL7GT	700KΩ	†220KΩ	0Ω	700KΩ	†100KΩ	100Ω	.1Ω	0Ω
V 2	6Y6G	Inf.	.1Ω	†300Ω	†3.5KΩ	220KΩ	290KΩ	0Ω	270Ω
V 3	6X5GT	Inf.	0Ω	135Ω	Inf.	140Ω	Inf.	.1Ω	50KΩ

† Measured From Pin 8 Of V3.
Note: Talk-Listen Switch In Listen Position.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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74-2

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

FADA MODELS
TV30, 799, 899, 930, 940

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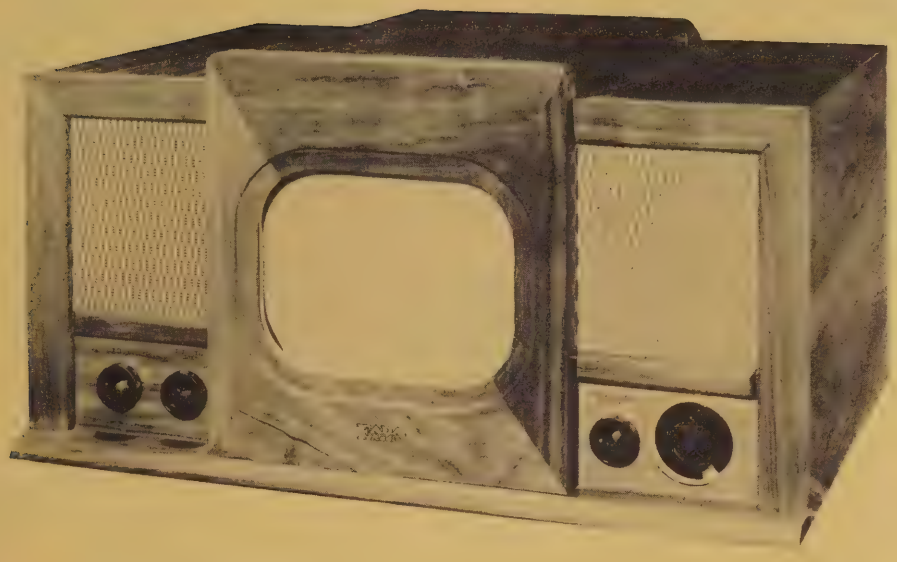

MODEL TV30

FADA MODELS
TV30, 799, 899, 930, 940

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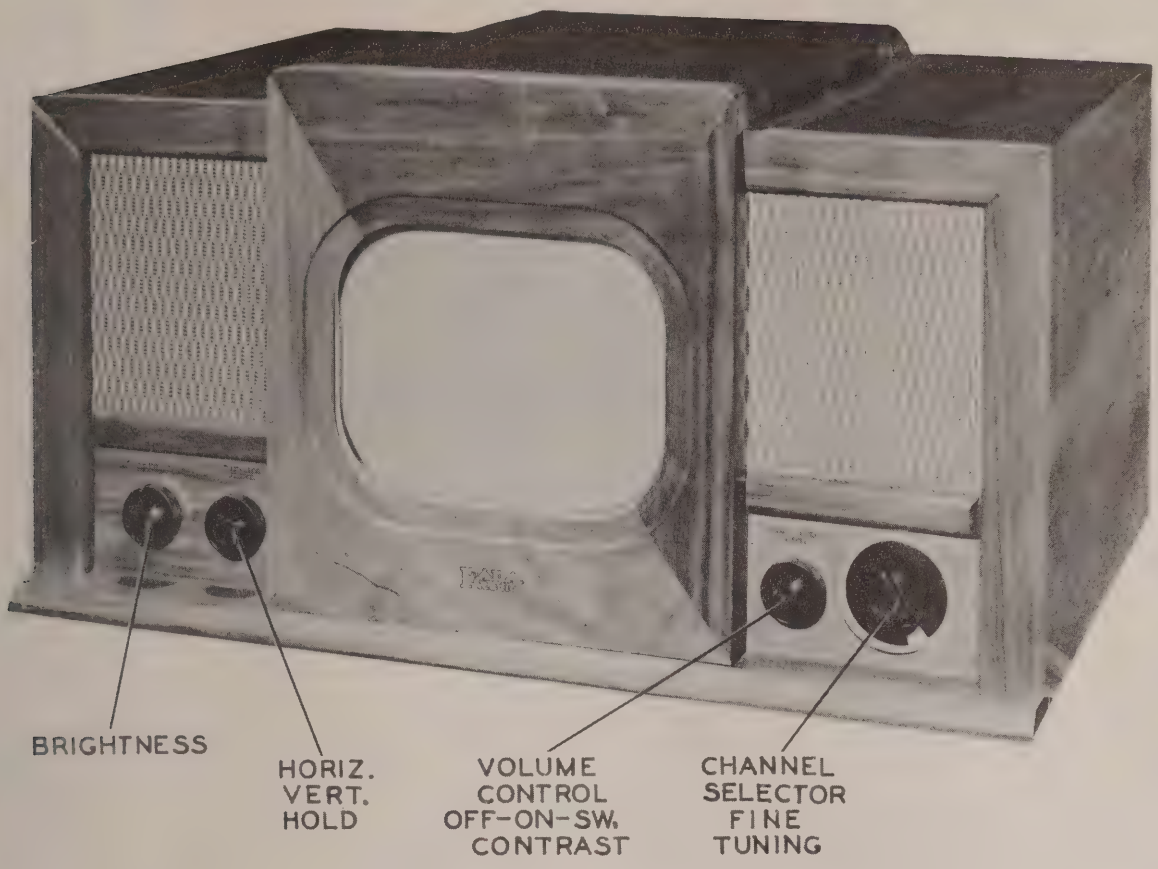

FADA MODELS
TV30, 799, 899, 930, 940

FADA MODEL TV-30

TRADE NAME Fada, Models TV-30, 799, 899, 930, and 940
MANUFACTURER Fada Radio and Electric Co., Inc., 525 Main St., Belleville, New Jersey
TYPE SET Television Receiver
TUBES Thirty

POWER SUPPLY 105-125 Volts 60 cycle AC RATING: 2.5 Amp. @ 117 Volts AC
TUNING RANGE—Channels 2 thru 13

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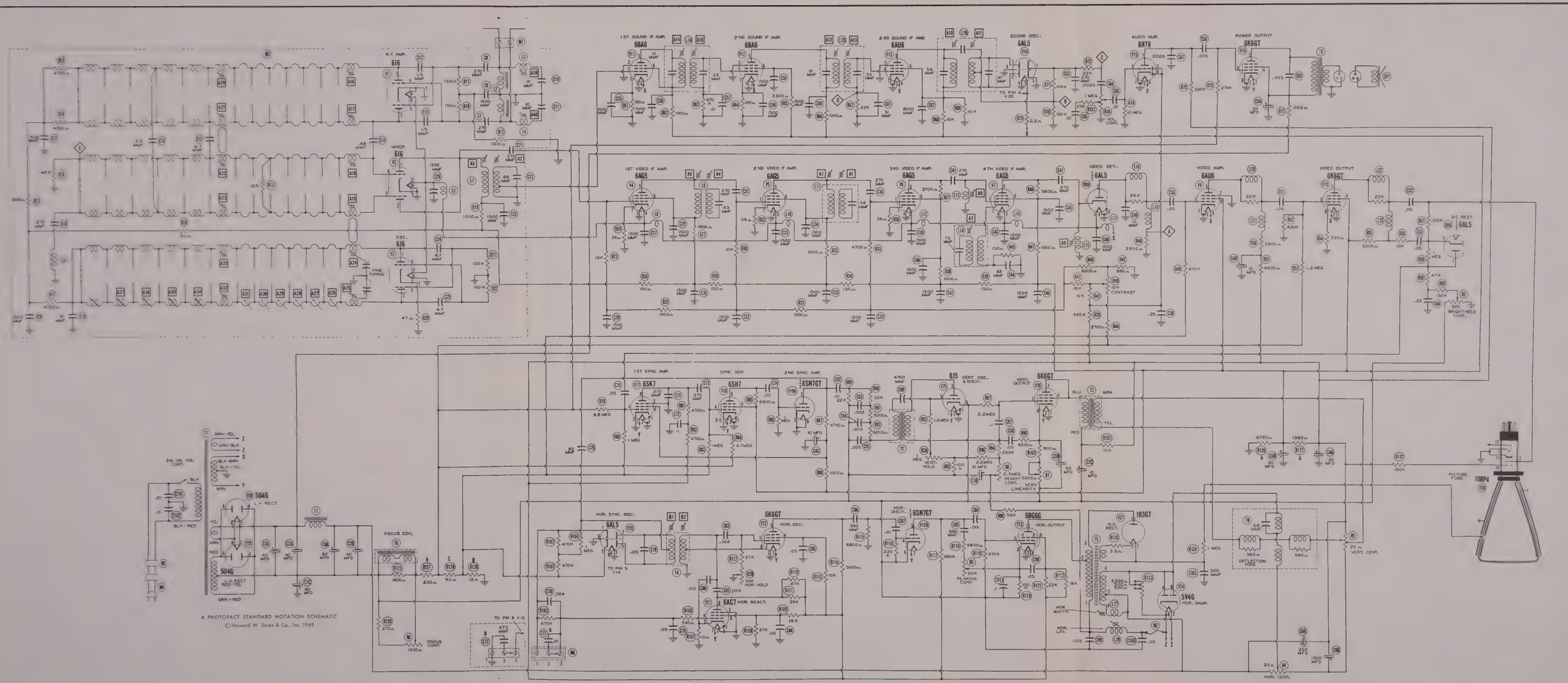

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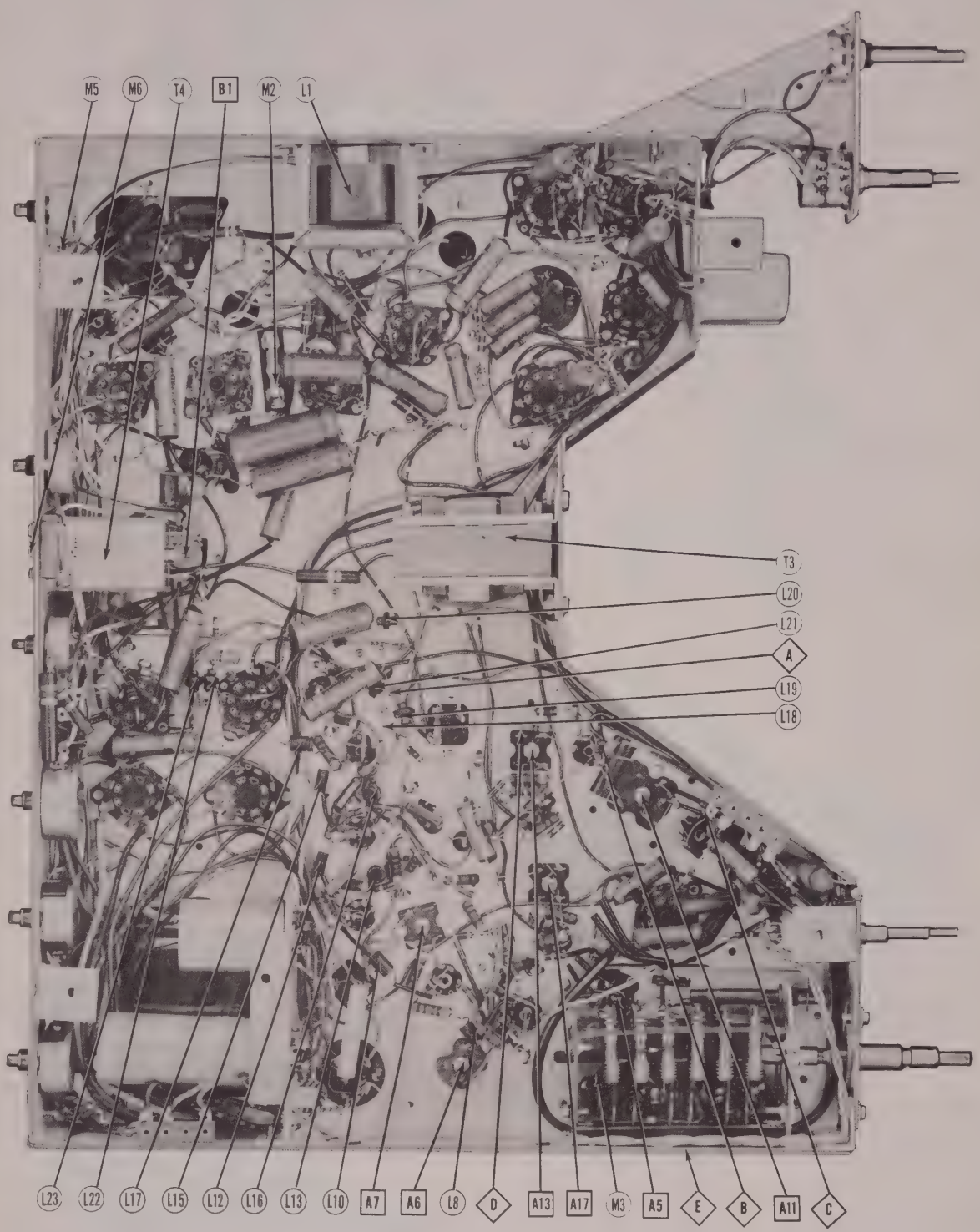
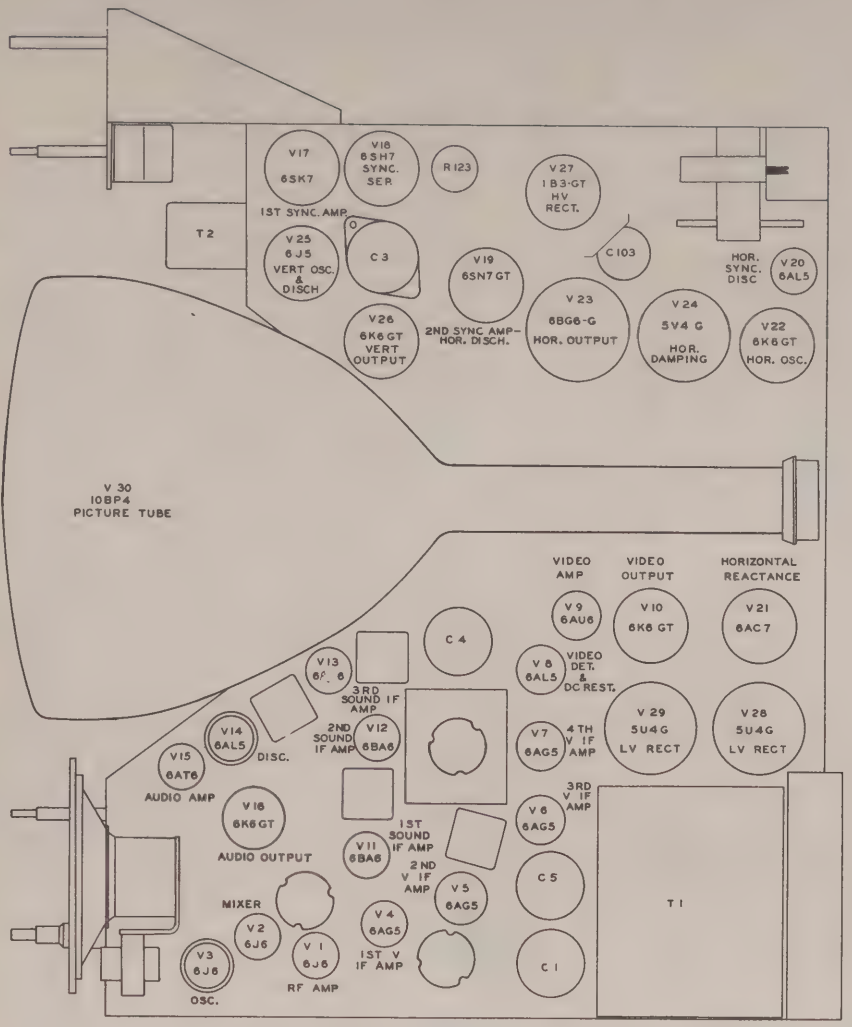
FADA MODELS
TV30, 799, 899, 930, 940

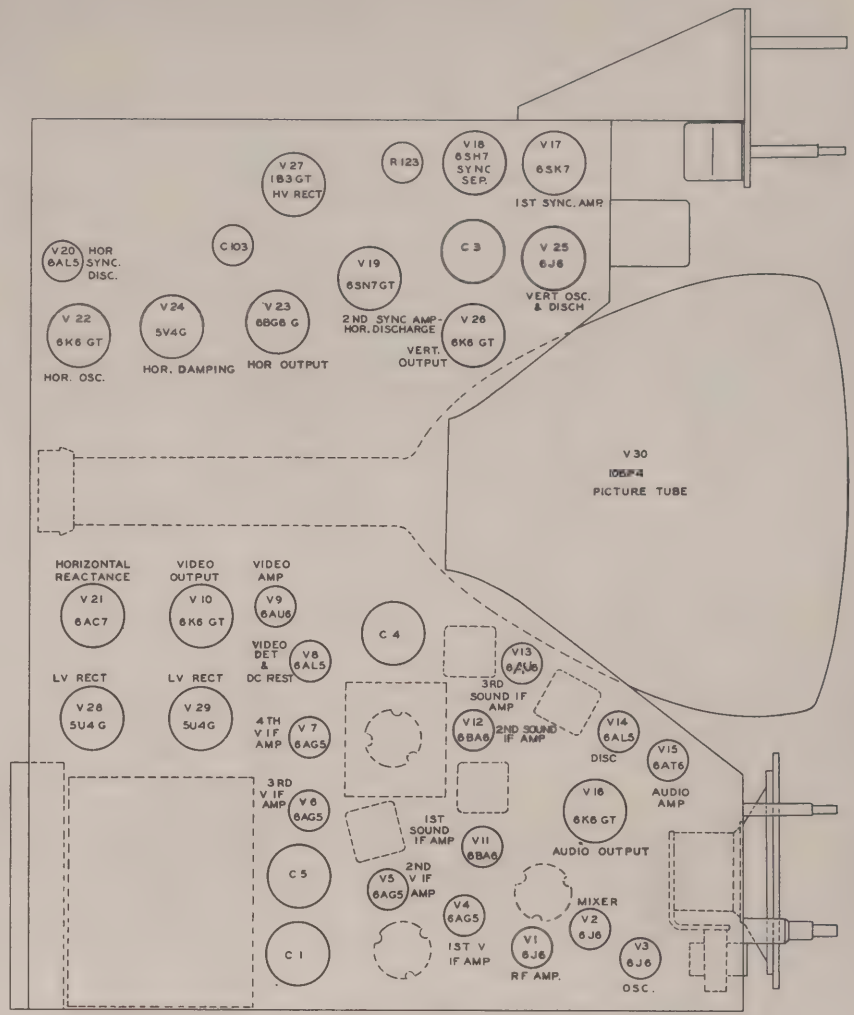
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



TOP VIEW



BOTTOM VIEW

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

PRE – ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If alignment is performed with picture tube removed, remove V22 from its socket to disable the high voltage supply.

The oscillator tube (V3) should be removed when performing IF adjustments. Use insulated alignment screwdriver for adjusting.

VIDEO IF ALIGNMENT

If receiver is badly misaligned making it impossible to get sufficent reading on VTVM with the signal being fed to the ant. terminals, signal may be fed to the mixer grid. This point is accessible through the hole in the chassis on right side of tuner (Point Ⓔ).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1				9	DC probe to junction of R40 and R41. Common to chassis.		Set contrast control to give a -3 volt reading. Leave at this setting during entire IF Alignment procedure.
2	Direct	To ant. terminals. (See prealignment notes)	19.75MC	9	DC probe to point Ⓐ .Common to chassis.	A1	Adjust for minimum deflection.
3	Direct	"	21.25MC	9	"	A2	"
4	Direct	"	21.25MC	9	"	A3	"
5	Direct	"	27.25MC	9	"	A4	"
6	Direct	"	21.8MC	9	"	A5	Adjust for maximum deflection.
7	Direct	"	25.3MC	9	"	A6	"
8	Direct	"	22.3MC	9	"	A7	"
9	Direct	"	25.2MC	9	"	A8	"
10	Direct	"	23.4MC	9	"	A9	Adjust for maximum deflection. If A7 required adjustment in Step 8 repeat Step 2. If FM signal gen. is not available continue with Step 12.

OVERALL VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal amplifier in the scope for horizontal deflection.

The waveforms shown may be inverted depending on the number of amplifying stages in the vertical amplifier in the scope being used.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11	5000 MMF	To dummy mixer tube. (See Fig. 6).	24MC (10MC sweep)	See Fig. 4.	9	Vert. Amp. to Point Ⓐ .Ground to chassis.	A5,A6, A7,A8, A9	Make slight adjustments if necessary to obtain response curve per Fig. 4. If considerable adjustment is required the traps must be realigned.

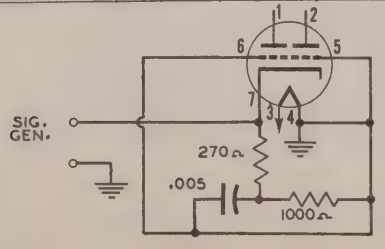
SOUND IF ALIGNMENT USING VTVM

Do not remove the shield covering the discriminator tube socket during Step 12. Fashion hook on 1 Megohm resistor and make connection to Point Ⓔ through alignment hole in shield.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
12	5000MMF	High side to Pin #1 of 3rd Sound IF (V13). Low side to chassis.	21.25MC	9	DC probe to Point Ⓔ in series with 1 Meg. Common to chassis.	A10	Detune A11. Adjust A10 for maximum deflection.
13	5000MMF	"	"	9	DC probe to Point Ⓓ .Common to chassis	A11	Adjust for zero reading. A positive or negative reading is obtained on either side of correct setting.
14	5000MMF	High side to Pin #1 of 2nd Sound IF (V12). Low side to chassis.	"	9	DC probe to Point Ⓓ .Common to chassis	A12,A13	Adjust for maximum deflection.
15	5000MMF	High side to tap on trap winding of L7. Low side to chassis.	"	9	"	A14, A15	"

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12	5000MMF	High side to Pin 1 of 3rd Sound IF (V13). Low side to chassis.	21.25MC (600KC sweep)	21.25MC	9	Vertical amp. to Point Ⓓ . Ground to chassis.	A10,A11	Adjust for maximum amplitude of peaks and straightness of diagonal line with marker at center of line.
13	5000MMF	High side to Pin 1 of 2nd Sound IF (V12). Low side to chassis.	"	"	9	Vert. amp. to Point Ⓓ in series with 33KΩ. Ground to chassis.	A12,A13	Adjust for maximum amplitude and symmetry per Fig. 2.
14	5000MMF	High side to tap on trap winding of L7. Low side to chassis.	"	"	9	"	A14,A15	Adjust for maximum amplitude and symmetry per Fig. 3. Continue with Step 16.



DUMMY MIXER TUBE

CAREFULLY BEND PIN 7 AT RIGHT ANGLE. CONNECT PINS 5 & 6 TO PIN 4 WHICH IS GROUNDED AT THE SOCKET. CONNECT OTHER COMPONENTS AS SHOWN.

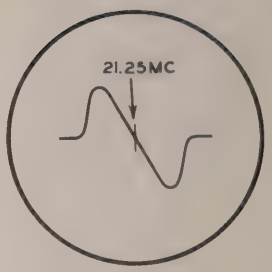


FIG. 1

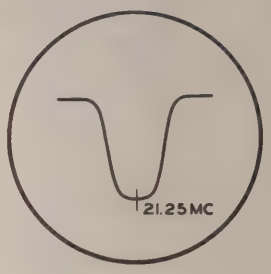


FIG. 2

FIG. 3

FIG. 4

FIG. 5

RF & MIXER LINE ALIGNMENT

On those models having the RF Grid returned to the contrast control it is necessary to set the bias at -1.5 volts. Connect DC probe of VTVM to pin 5 or 6 of 1st AF Tube (V15), common to chassis and set contrast control for reading of -1.5 volts.

The signal generator output should be terminated with a resistance equal to its output impedance (usually 50 ohms).

These adjustments are usually very stable and alignment should not be attempted unless they are known to be out of alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16	120Ω carbon res. in series with each lead	To ant. terminals.	177MC (10MC sweep)	175.25MC and 179.75MC	7	Vert. amp. to Point ⊕ in series with 10KΩ. Ground to chassis.	A16,A17, A18,A19	Adjust for approx. flat top response per Fig. 5 with markers above 70%.
17	"	"	183MC (10MC sweep)	181.25MC and 185.75MC	8	"		Check for response curve per Fig. 5.
18	"	"	189MC (10MC sweep)	187.25MC and 191.75MC	9	"		"
19	"	"	195MC (10MC sweep)	193.25MC and 197.75MC	10	"		"
20	"	"	201MC (10MC sweep)	199.25MC and 203.75MC	11	"		"
21	"	"	207MC (10MC sweep)	205.25MC and 209.75MC	12	"		"
22	"	"	213MC (10MC sweep)	211.25MC and 215.75MC	13	"		"

If markers are below 70% on any channel make slight adjustment of A16, A17, A18 and A19 with channel selector on that channel. Recheck the other low band channels.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
23	120Ω carbon res. in series with each lead	To ant. terminals.	85MC (10MC sweep)	83.25MC and 87.75MC	6	Vert. amp. to Point ⊕ in series with 10KΩ. Ground to chassis.	A20,A21 A22,A23	Adjust for approx. flat top response per Fig. 5 with markers above 70%.
24	"	"	79MC (10MC sweep)	77.25MC and 81.75MC	5	"		Check for response curve per Fig. 5.
25	"	"	69MC (10MC sweep)	67.25MC and 71.75MC	4	"		"
26	"	"	63MC (10MC sweep)	61.25MC and 65.75MC	3	"		"
27	"	"	57MC (10MC sweep)	55.25MC and 59.75MC	2	"		"

If markers are below 70% on any channel make slight adjustments of A20, A21, A22 and A23 with channel selector on that channel. Recheck the other high band channels.

OSCILLATOR ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
28	2 - 120Ω carbon res.	To ant. terminals.	215.75MC	13	DC probe to Point ⊕. Common to chassis.	A24,A25	Adjust for zero reading. A positive and negative reading is obtained on either side of correct setting. Keep A24 and A25 slugs at approx. the same relative setting.
29	"	"	209.75MC	12	"	A26	Adjust for zero reading as above.
30	"	"	203.75MC	11	"	A27	"
31	"	"	197.75MC	10	"	A28	"
32	"	"	191.75MC	9	"	A29	"
33	"	"	185.75MC	8	"	A30	"
34	"	"	179.75MC	7	"	A31	"
35	"	"	87.75MC	6	"	A32,A33	Adjust for zero reading keeping A32 and A33 slugs at approx. the same relative position.
36	"	"	81.75MC	5	"	A34	Adjust for zero reading.
37	"	"	71.75MC	4	"	A35	" " " "
38	"	"	65.75MC	3	"	A36	" " " "
39	"	"	59.75MC	2	"	A37	" " " "

MIXER GRID TRAP ADJUSTMENT

A. Match the output of the signal generator (usually 50Ω carbon resistor across the gen. output and 120Ω carbon resistors in each lead) and connect to receiver antenna terminals.
B. Connect oscilloscope to Point ⊕ through 10KΩ.
C. Shunt 1st Video IF Grid to ground with 1000 MMF cap. using shortest possible leads.
D. Loosely couple marker generator to antenna terminals.
E. Turn channel switch and marker generator through low frequency channels and observe response of each channel.
F. Select channel that is essentially flat with sound and picture markers at 80% or more on the response curve.
G. Remove shunt on 1st IF Grid and shunt the 2nd Video IF Grid to ground.
H. Adjust A38 (rear of tuner) for RF response similar to one selected with 1st IF Grid shunted.

NOTE: In later productions A38 is a fixed capacitor (C18). In those receivers this step may be followed as a check that correct mixer operation is obtained.

WAVE TRAP ADJUSTMENT

Wave traps A39 and A40 are used for specific types of interference and their alignment will depend upon the type encountered.

With the receiver tuned to the channel having the interference, set fine tuning control until maximum interference is received. Adjust A39 and A40 for minimum interference in the picture and sound keeping the cores at approximately the same relative position. Then turn one core 1/2 turn and adjust the other for minimum interference.

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
V 1	6J6	50VDC	50VDC	6.2VAC	0V.	-.2VDC	-.2VDC	0V.	-	-
V 2	6J6	95VDC	95VDC	6.2VAC	0V.	-2VDC	-3.1VDC	0V.	-	-
V 3	6J6	55VDC	55VDC	6.2VAC	0V.	-5.4VDC	-5.2VDC	.2VDC	-	-
V 4	6AG5	0V.	0V.	0V.	6.2VAC	95VDC	95VDC	.3VDC	-	-
V 5	6AG5	-.8VDC	.2VDC	6.2VAC	0V.	98VDC	98VDC	.2VDC	-	-
V 6	6AG5	-.8VDC	.2VDC	6.2VAC	0V.	93VDC	105VDC	.2VDC	-	-
V 7	6AG5	0V.	1VDC	6.2VAC	0V.	85VDC	110VDC	1VDC	-	-
V 8	6AL5	0V.	0V.	6.2VAC	0V.	.7VDC	0V.	0V.	-	-
V 9	6AU6	-.6VDC	0V.	0V.	6.2VAC	255VDC	117VDC	0V.	-	-
V 10	6K6GT	0V.	0V.	92VDC	117VDC	-2VDC	0V.	6.2VAC	2.8VDC	-
V 11	6BA6	0V.	0V.	0V.	6.2VAC	103VDC	103VDC	1.4VDC	-	-
V 12	6BA6	0V.	0V.	6.2VAC	0V.	107VDC	105VDC	1VDC	-	-
V 13	6AU6	-.3VDC	0V.	0V.	6.2VAC	45VDC	45VDC	0V.	-	-
V 14	6AL5	2.2VDC	-.4VDC	4.9VAC	0V.	0V.	0V.	-.7VDC	-	-
V 15	6AT6	-.4VDC	0V.	0V.	6.2VAC	-.8VDC	-.8VDC	75VDC	-	-
V 16	6K6GT	0V.	6.2VAC	240VDC	250VDC	-9VDC	0V.	0V.	0V.	-
V 17	6SK7	0V.	0V.	0V.	-.8VDC	0V.	108VDC	6.2VAC	208VDC	-
V 18	6SH7	0V.	0V.	0V.	-2.6VDC	0V.	117VDC	6.2VAC	115VDC	-
V 19	6SN7GT	-1.4VDC	77VDC	0V.	-120VDC	-37VDC	-90VDC	6.2VAC	0V.	-
V 20	6AL5	-.8VDC	-5.8VDC	0V.	4.9VAC	-2VDC	0V.	-6.5VDC	-	-
V 21	6AC7	0V.	0V.	0V.	-.9VDC	0V.	105VDC	6.2VAC	190VDC	-
V 22	6K6GT	0V.	0V.	170VDC	210VDC	-18.5VDC	340VDC	6.2VAC	.3VDC	-
V 23	6BG6-G	0V.	6.2VAC	-82VDC	0V.	-94VDC	0V.	0V.	165VDC	#
V 24	5V4G	0V.	350VDC	0V.	290VDC	0V.	290VDC	0V.	350VDC	-
V 25	6J5	0V.	0V.	-3.2VDC 200VDC	-90VDC	-115VDC	-85VDC	6.2VAC	-90VDC	-
V 26	6K6GT	0V.	6.2VAC	187VDC	187VDC	-55VDC	-67VDC	0V.	-50VDC	-
V 27	1B3GT	#DO NOT	MEASURE.							
V 28	5U4G	0V.	350VDC	0V.	360VAC	0V.	360VAC	0V.	350VDC	-
V 29	5U4G	0V.	350VDC	0V.	360VAC	0V.	360VAC	0V.	350VDC	-
V 30	10BP4	0V.	1VDC	PIN 10 280VDC	PIN 11 0V.	PIN 12 6.2VAC				

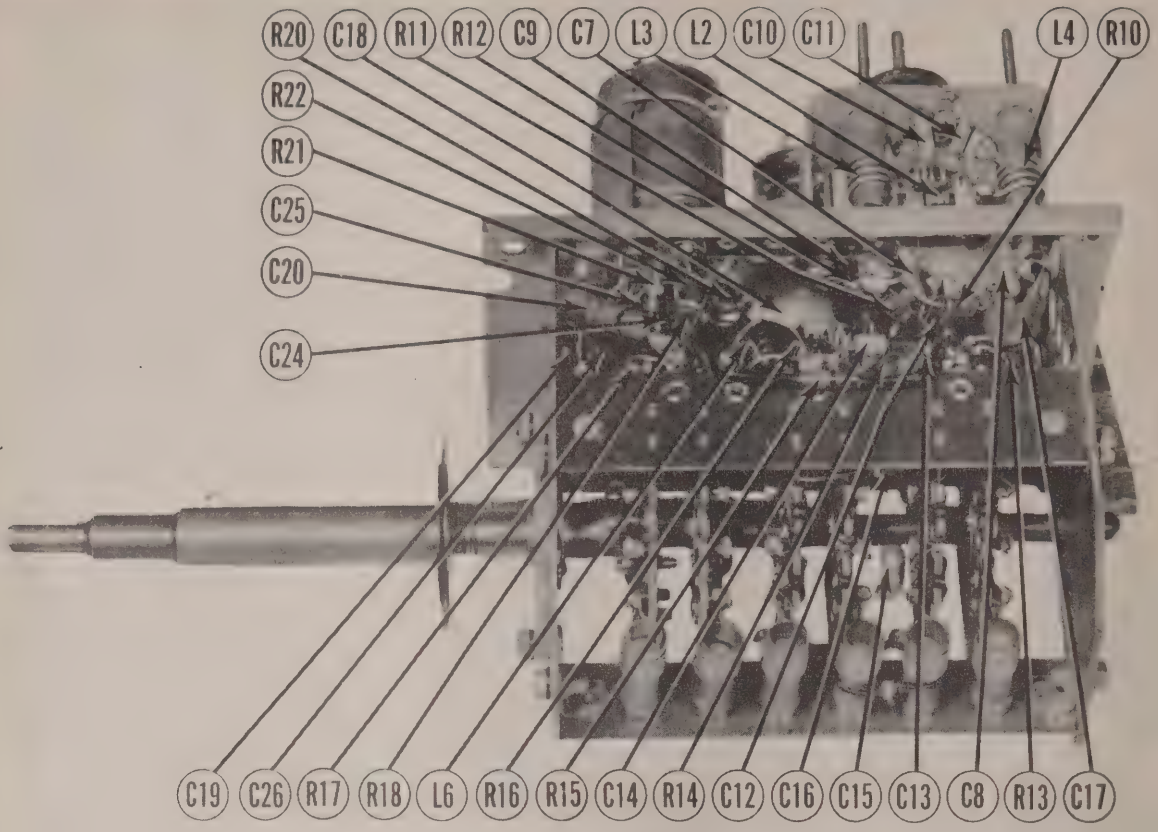
#DO NOT MEASURE.

RESISTANCE READINGS

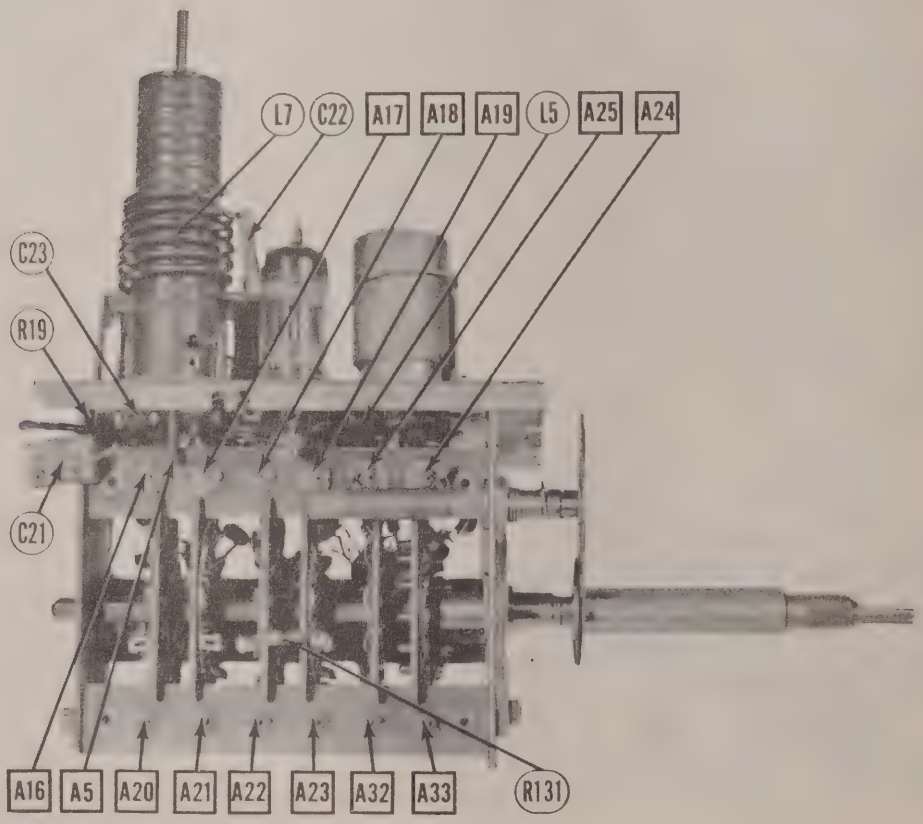
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
V 1	6J6	6KΩ*	6KΩ*	.1Ω	0Ω	1KΩ	1KΩ	0Ω	-	-
V 2	6J6	3KΩ*	3KΩ*	.1Ω	0Ω	1 Meg.	1 Meg.	0Ω	-	-
V 3	6J6	6.8KΩ*	6.8KΩ*	.1Ω	0Ω	100KΩ	100KΩ	47Ω	-	-
V 4	6AG5	17KΩ	40Ω	0Ω	.1Ω	3KΩ*	3KΩ*	40Ω	-	-
V 5	6AG5	16KΩ	40Ω	.1Ω	0Ω	3KΩ*	3KΩ*	40Ω	-	-
V 6	6AG5	10KΩ	40Ω	.1Ω	0Ω	5KΩ*	2.5KΩ*	40Ω	-	-
V 7	6AG5	.2Ω	150Ω	.1Ω	0Ω	7.5KΩ*	2.5KΩ*	150Ω	-	-
V 8	6AL5	.2Ω	100KΩ	.1Ω	0Ω	1.2 Meg.	0Ω	4KΩ	-	-
V 9	6AU6	500KΩ	0Ω	0Ω	.1Ω	9KΩ*	1.4KΩ*	0Ω	-	-
V 10	6K6GT	0Ω	0Ω	4.5KΩ*	1.4KΩ*	500KΩ	INF.	.1Ω	330Ω	-
V 11	6BA6	.1Ω	0Ω	0Ω	.1Ω	2.5KΩ*	2.5KΩ*	100Ω	-	-
V 12	6BA6	500KΩ	0Ω	.1Ω	0Ω	2.5KΩ*	4.2KΩ*	100Ω	-	-
V 13	6AU6	20KΩ	0Ω	0Ω	.1Ω	7KΩ*	7KΩ*	0Ω	-	-
V 14	6AL5	200KΩ	100KΩ	.1Ω	0Ω	0Ω	0Ω	100KΩ	-	-
V 15	6AT6	10 Meg.	0Ω	0Ω	.1Ω	10KΩ	10KΩ	330KΩ*	-	-
V 16	6K6GT	INF.	.1Ω	1.5KΩ*	1KΩ*	250KΩ	260KΩ	0Ω	0Ω	-
V 17	6SK7	0Ω	0Ω	0Ω	900KΩ	0Ω	2.2KΩ*	.1Ω	9KΩ*	-
V 18	6SH7	0Ω	0Ω	0Ω	900KΩ	0Ω	1.4KΩ*	.1Ω	7.5KΩ*	-
V 19	6SN7GT	1.2 Meg.	7KΩ*	0Ω	230KΩ	650KΩ*	450Ω	.1Ω	0Ω	-
V 20	6AL5	900KΩ	1.5 Meg.	0Ω	.1Ω	12Ω	0Ω	1.5 Meg.	-	-
V 21	6AC7	0Ω	0Ω	0Ω	1.4 Meg.	10Ω	18KΩ*	.1Ω	20KΩ*	-
V 22	6K6GT	INF.	0Ω	5KΩ*	10KΩ*	25KΩ	5.8KΩ*	.1Ω	10Ω	-
V 23	6BG6-G	INF.	.1Ω	540Ω	INF.	450KΩ	INF.	0Ω	9.5KΩ*	6KΩ*
V 24	5V4G	INF.	5.5KΩ*	INF.	50Ω*	INF.	50Ω*	INF.	5.5KΩ*	-
V 25	6J5	0Ω	0Ω	280KΩ* 1.3 Meg.*	65KΩ	1.5 Meg.	65KΩ	.1Ω	450Ω	-
V 26	6K6GT	INF.	.1Ω	10KΩ*	10KΩ*	2.5 Meg.	2500Ω	0Ω	2KΩ* 6.3KΩ	-
V 27	1B3GT	INF.	INF.	INF.	INF.	INF.	INF.	INF.	INF.	6KΩ*
V 28	5U4G	INF.	5.5KΩ	INF.	460Ω	INF.	460Ω	INF.	5.5KΩ	-
V 29	5U4G	INF.	5.5KΩ	INF.	460Ω	INF.	460Ω	INF.	5.5KΩ	-
V 30	10BP4	0Ω	1.3 Meg.	PIN #10 150KΩ*	PIN #11 0Ω	PIN #12 .1Ω				

*MEASURED FROM PIN 8 OF V28.

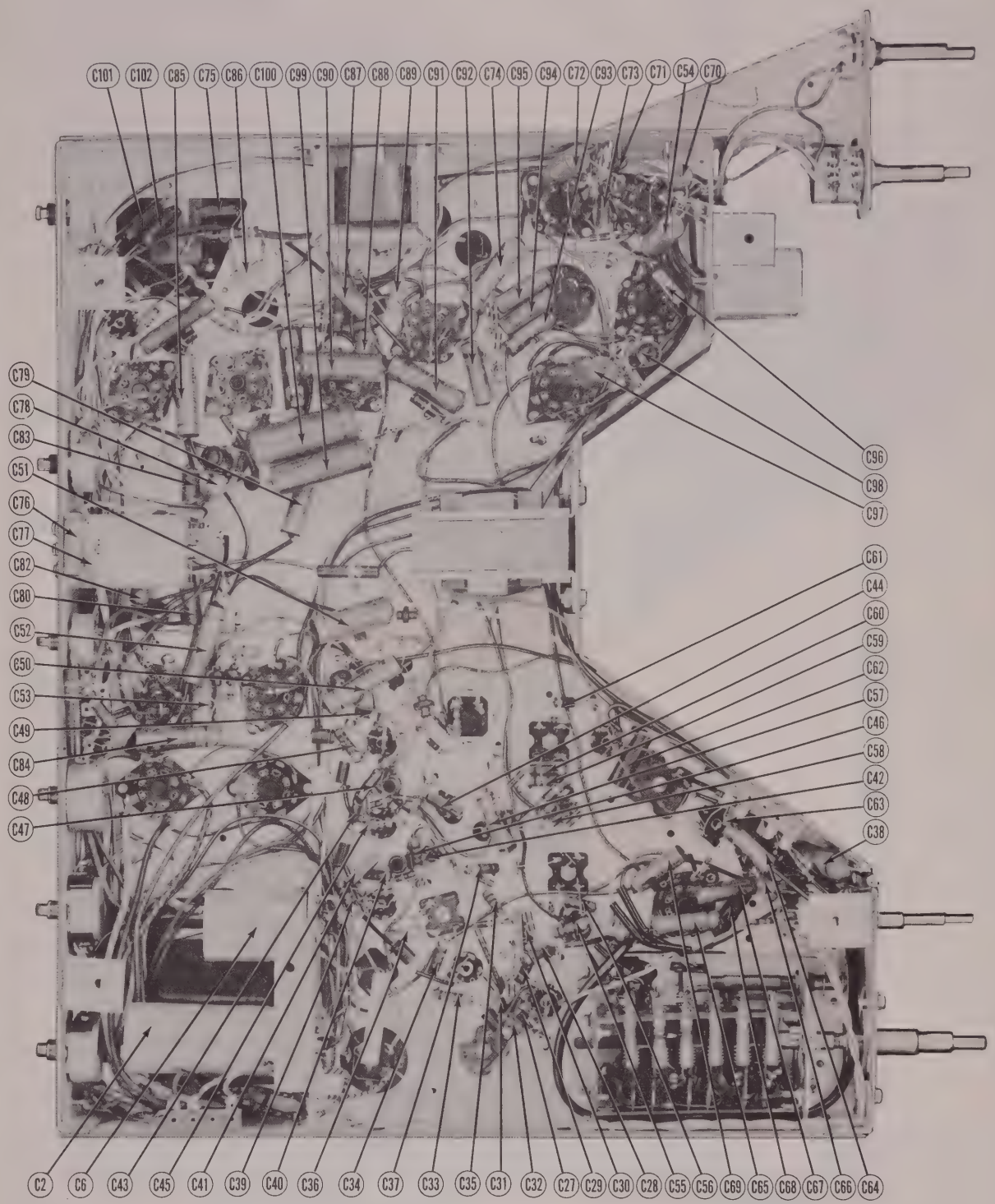
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at maximum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



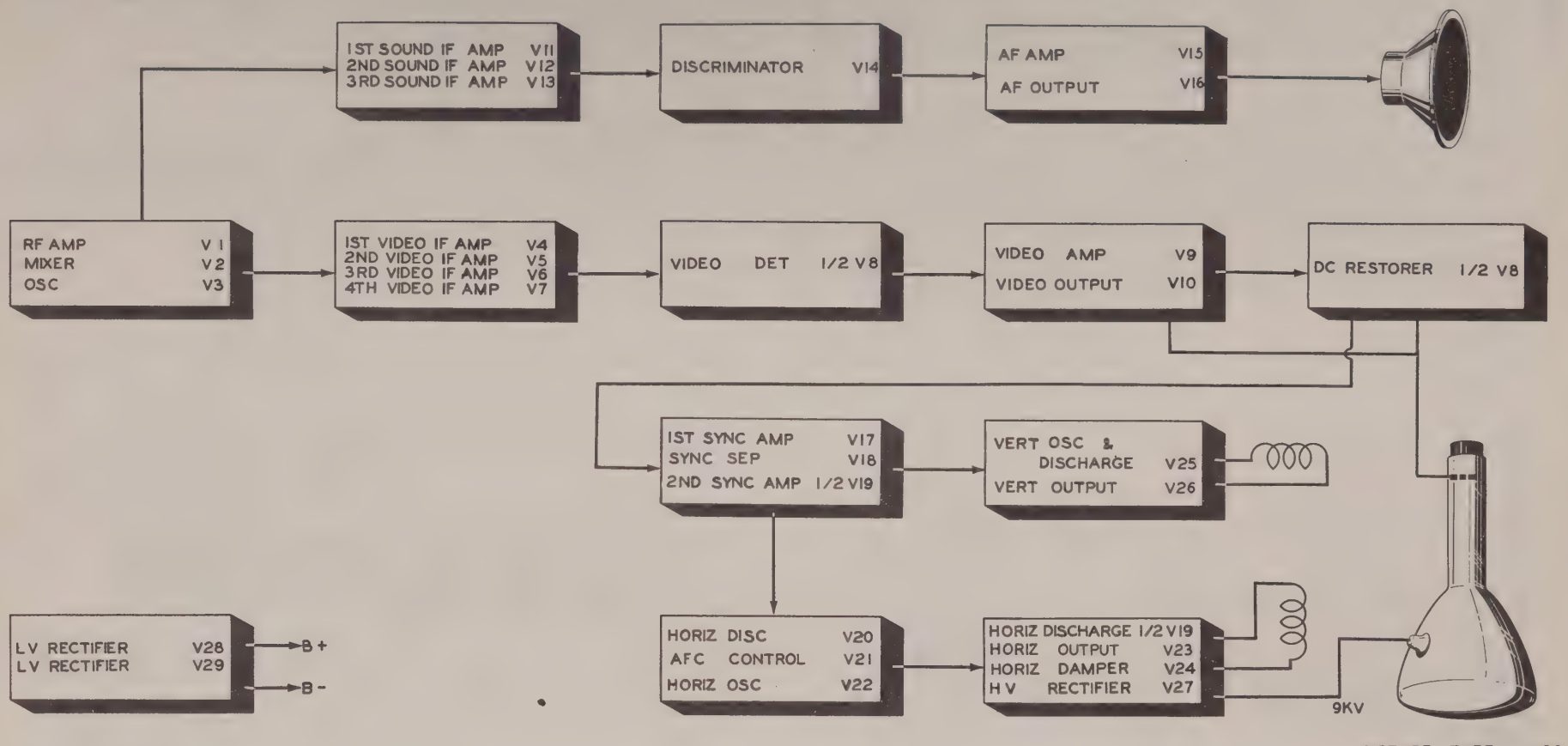
RF TUNER – RIGHT SIDE



RF TUNER – LEFT SIDE



CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION



BLOCK DIAGRAM

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AU6	6AU6	7AK	
V2	Mixer	6U8	6U8	7AP	
V3	Oscillator	6T8	6T8	7AP	
V4	1st V. IF Amp.	6AU6	6AU6	7BD	
V5	2nd V. IF Amp.	6AU6	6AU6	7BD	
V6	3rd V. IF Amp.	6AU6	6AU6	7BD	
V7	4th V. IF Amp.	6AU6	6AU6	7BD	
V8	Video Det., DC Rest.	6AL5	6AL5	6BT	
V9	Video Amp.	6AW8	6AW8	7BK	
V10	Video Output	6K6GT	6K6GT	7S	
V11	1st S. IF Amp.	6BA6	6BA6	7BK	
V12	2nd S. IF Amp.	6BA6	6BA6	7BK	
V13	3rd S. IF Amp.	6AU6	6AU6	7BD	
V14	Sound Det.	6AL5	6AL5	6BT	
V15	Audio Amp.	6AT6	6AT6	7BT	
V16	Power Output	6K6GT	6K6GT	7S	
V17	1st Sync. Amp.	6SN7	6SN7	8N	
V18	Sync. Sep.	6SH7	6SH7	8BK	
V19	2nd Sync. Amp., Hor. Discharge	6SN7GT	6SN7GT	8BD	
V20	Hor. Sync. Disc.	6AL5	6AL5	6BT	
V21	Hor. React.	6AC7	6AC7	8N	
V22	Hor. Osc.	6K6GT	6K6GT	7S	
V23	Hor. Output	6BG6-G	6BG6-G	5BT	
V24	Damper	5V4G	5V4G	5L	
V25	Vert. Sep., Discharge	6J5	6J5	8Q	
V26	Vert. Output	6K6GT	6K6GT	7S	
V27	V. Osc.	1B3GT	1B3GT	5C	
V28	LV Rect.	5U4G	5U4G	5T	
V29	LV Rect.	5U4G	5U4G	5T	
V30	Picture Tube	10BP4	10BP4	12D	Used in models TV-30, 799, 899
		12LP4	12LP4	12D	Used in Models 930,940

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	22.22		CP6072S-3		D14367	◓ Filter
B	10	450						■ Filter
C	80	160						▲ Bias Filter
C2A	40	450	22.23		UP8C887-3		D14648	◓ Filter
B	40	450						■ Filter
C	10	450						▲ Vert. Out. Plate Decoup.
C3A	80	450	22.24		UP5B730-3		D14369	◓ Filter
B	50	50						■ Low Pass Filter
C4A	40	450	22.25		UP9C731-2		D14370	◓ Filter
B	10	450						■ Low Pass Filter
C	20	350						▲ 2nd Sync. Amp. Plate
C5A	40	450	22.26		UP9B337-1		D14371	◓ Audio Out. Screen
B	80	350						▲ Filter
C6A	250	10	22.27	PRS12/250	UP7B808-4		D14338	■ Filter
B	1000	6		PRS6/1000				▲ Filter
C7	270					GP2K-270		Ant. Coupling
C8	270					GP2K-270		" "
C9	1500		17.12			GP2L-0015		RF Bypass
C10	10					NPOK-10		Fixed Trimmer
C11	10					NPOK-10		" "
C12	1.5		17.67			NPOK-1.5		RF Neutralizer
C13	1.5		17.67			NPOK-1.5		" "
C14	.68		17.66					RF Coupling
C15	4.7					NPOK-4.7		"
C16	2.2							" "
C17	1500		17.12			GP2L-0015		RF Decoupling
C18	270					GP2K-270		RF Bypass
C19	10					GP1K-10		RF Decoupling
C20	1500		17.12			GP2L-0015		" "
C21	270	500				GP2K-270		IF Coupling
C22	68					GP1K-68		Fixed Trimmer
C23	1500		17.12			GP2L-0015		Mixer Decoupling
C24	4.7					NPOK-4.7		Osc. Feedback
C25	4.7					NPOK-4.7		" "
C26	1500		17.12	1467-0015	1W5D15	GP2L-0015	1FM-215	Fil. Bypass
C27	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	" "
C28	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	Bias Filter
C29	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	1st V. IF Decoupling.
C30	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C31	270	500	17.9	1468-0003	5W5T3	GP2K-270		Video IF Coupling
C32	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	Bias Filter
C33	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd V. IF Fil. Byp.
C34	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd V. IF Decoup.
C35	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C36	270	500	17.9	1468-0003	5W5T3	GP2K-270		Video IF Coupling
C37	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	Bias Filter
C38	.25	400	12.16	P488-.25			TC-2	" "
C39	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd V. IF Fil. Byp.
C40	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd V. IF Decoupling
C41	270	500	17.9	1468-0003	5W5T3	GP2K-270		Video IF Coupling
C42	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C43	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	4th V. IF Fil. Byp.
C44	82		17.37					4th V. IF Cath.
C45	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	4th V. IF Decoup.
C46	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C47	270	500	17.9	1468-0003	5W5T3	GP2K-270		Video Coupling
C48	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	Video Det. Fil. Byp.
C49	10	500	17.33	1468-00001	5W5Q1	GP1K-10		RF Filter
C50	.05	400	12.12	P488-05	GT4S5		TM-15	Video Coupling
C51	.05	400	12.38	P488-05	GT4S5		TM-15	" "
C52	.05	400	12.12	P488-05	GT4S5		TM-15	" "
C53	.05	400	12.12	P488-05	GT4S5		TM-15	Video Coupling
C54	.25	400	12.16	P488-.25	GT4P25		TC-2	Bias Filter

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C55	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	1st S. IF Cath. Byp.
C56	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	1st S. IF Decoupling
C57	.01	400	12.6	P488-01	GT4S1	GP2-335-01	TM-11	2nd S. IF Grid Filter
C58	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd S. IF Cath. Byp.
C59	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd S. IF Screen Byp.
C60	1500		17.45	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd S. IF Plate Decoupling
C61	51		17.18			GP1K-50		3rd S. IF Grid Filter
C62	6800		17.35					3rd S. IF Decoupling
C63	270	500	17.9	1468-0003	5W5T3	GP2K-270		De-emphasis
C64	.005	400	12.2			GP2M-0025		Audio Coupling
C65	.01	400	12.6	P488-01	GT4S1	GP2-335-01	TM-11	Tone Compensation
C66	.01	400	12.6	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C67	.0025	400	12.2			GP2M-0025		Audio Plate Bypass
C68	.005	400	12.12	P688-005	GT6D5	GP2M-005	TM-25	Audio Coupling
C69	.005	400	12.12	P688-005	GT6D5	GP2M-005	TM-25	Output Plate Bypass
C70	.05	400	12.12	P438-05	GT4S5		TM-15	Sync. Coupling
C71	270	500	17.9	1468-0003	5W5T3	GP2K-270		1st Sync. Amp. Plate
C72	.1	400	12.15	P488-.1	GT4P1		TM-1	1st Sync. Amp. Plate Decoup
C73	270	500	17.9	1468-0003	5W5T3	GP2K-270		Sync. Coupling
C74	.05	400	12.12	P488-05	GT4S5		TM-15	" "
C75	82	500	17.37					Hor. Sync. Coupling
C76	.004	1000	12.35	P1088-004			PX-241	AFC Filter
C77	.01	400	12.6	1468-0005	5W5T5	GP2-335-01	1FM-35	Video Output Cath. Byp.
C78	.015	400	12.36					Fixed Trimmer
C79	.05	400	12.12	P488-05	GT4S5		TM-15	AFC Filter
C80	.015	400	12.36					Phase Shifter
C82	.004	400	12.35	P688-004	GT6D4		TM-24	AFC Coupling
C83	.004	400	12.35	P688-004	GT6D4		TM-24	Hor. Sync. Coupling
C84	.01	400	12.12	P488-05	GT4S5		TM-15	H. Osc. Contr. Screen
C85	.004	400	12.12	P438-04	GT4S5		TM-15	Hor. Osc. Screen
C86	390	500	17.38	1468-0004	5W5T4	GP2K-390	1FM-34	Differentiator Net.
C87	.01	400	12.6	P488-01	GT4S1	GP2-335-01	TM-11	Hor. Sync. Coupling
C88	.001	400	12.34	P688-001	GT6D1	GP2L-001	TM-21	" "
C89	680	500	17.39			GP2K-680		Hor. Discharge
C90	.05	400	12.38	P488-05	GT4S5		TM-15	Hor. Output Screen
C91	.1	400	12.14	P499-1	GT4P1		TM-1	Hor. Output Cathode
C92	.01	400	12.6	P488-01	GT4S1	GP2-335-01	TM-11	Vert. Sync. Coupling
C93	.002	400	12.2	P688-002	GT6D2	GP2M-002	TM-22	Integrating Net.
C94	.005	400	12.19	P688-005	GT6D5	GP2M-005	TM-25	" "
C95	.005	400	12.19	P688-005	GT6D5	GP2M-005	TM-25	" "
C96	4700	500	17.40	1467-005		GP2M-0047	1FM-25	Vert. Osc. Grid
C97	.1	400	12.15	P488-.1	GT4P1		TM-1	Vert. Coupling
C98	.05	600	12.38	P688-05	GT6S5		TM-15	Vert. Discharge
C99	.035	600	12.37					Damper Filter
C100	.05	600	12.38	P688-05	GT6S5		TM-15	" "
C101	.01	400	12.22	P488-01	GT4S1	GP2-335-01	TM-11	Line Filter
C102	.01	400	12.22	P488-01	J74S1	GP2-335-01	TM-11	" "
C103	500	10000	17.41					HV Filter T. C.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg. & 10KΩ	½	52.22			Volume control tapped @ 200KΩ
B	Switch					Contrast control (Dual Concentric)
C						On-Off switch-SPST
R2A	1 Meg. & 50KΩ	½	52.21			Vertical Hold Horizontal Hold (Dual Concentric)
R3	50KΩ	½	52.20	Q11-123	M-44-S	Brightness control
R4	20Ω	2	52.26	W-20	43-20	Horiz. Centering-Center Tap. Not Used
R5	20Ω	2	52.26	W20X10	43-20CT	Vert. Centering-Tapped @ 10Ω
R6	1500Ω	4	52.27			Focus control
R7A	500KΩ	½	52.25	Q11-114	AM-19-S	Vert. Linearity
B	Shaft			Not Req.	KSS-3	Attach to R7A Per Instructions
R8	2.5 Meg	½	52.24			Height control
R9A	20KΩ	½	52.23	Q11-120	AM-40-S	Peaking
B	Shaft			Not Req.	KSS-3	Attach to R9A Per Instructions

* On Models 930, 940 the Brightness and Focus controls are combined in one dual concentric control - Fada Part No. 52.48.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
					ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R10	150Ω	½	32.4		RF Amp. Grid 20%
R11	150Ω	½	32.4		" " " 20%
R12	1000Ω	½	32.8	BTS-1000	Bias Network 20%
R13	4700Ω	½	32.9	BTS-4700	RF Amp. Plate 20%
R14	4700Ω	½	32.9	BTS-4700	" " " 20%
R15	1000Ω	½	32.8	BTS-1000	RF Amp. Plate Decupling 20%
R16	1 Meg.	½	32.33	BTS-1 Meg.	Mixer Grid 20%
R17	4700Ω	½	32.9	BTS-4700	Osc. Plate 20%
R18	150Ω	½	32.4		Decoupling 20%
R19	1000Ω	½	32.8	BTS-1000	Conv. Plate Decoupling 20%
R20	47Ω	½	32.5		Osc. Cathode 20%
R21	100KΩ	½	32.17	BTS-100K	Osc. Grid 20%
R22	100KΩ	½	32.17	BTS-100K	Osc. Grid 20%
R23	10KΩ	½	32.80	BTS-10K-5%	1st Video IF Grid 5%
R24	39Ω	½	32.64		1st Video IF Cathode
R25	1000Ω	½	32.8	BTS-1000	IF Contrast Bias Network 20%
R26	150Ω	½	32.4		Decoupling
R27	1000Ω	½	32.8	BTS-1000	" " 20%
R28	150Ω	½	32.4		"
R29	680KΩ	½	32.93	BTS-680K-5%	Voltage Dropping 5%
R30	10KΩ	½	32.80	BTS-10K-5%	2nd Video IF Grid 5%
R31	1000Ω	½	32.8	BTS-1000	IF Contrast Bias Network 20%
R32	39Ω	½	32.64		2nd Video IF Cathode
R33	1000Ω	½	32.8	BTS-1000	Decoupling 20%
R34	150Ω	½	32.4		"
R35	4700Ω	½	32.75	BTS-4700-5%	3rd Video IF Grid 5%
R36	39Ω	½	32.64		3rd Video IF Cathode
R37	2700Ω	½	32.57	BTS-2700-5%	3rd Video IF Plate 5%
R38	1000Ω	½	32.8	BTS-1000	Decoupling 20%
R39	150Ω	½	32.4		"
R40	8200Ω	½	32.77	BTS-8200	Contrast Bias Network
R41	16KΩ	½	32.61	BTS-16K	" " "

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FADA PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R42	680Ω	½	32.51	BTS-680	" " "
R43	10KΩ	½	32.11	BTS-10K	" " "
R44	2700Ω	½	32.57	BTS-2700	" " "
R45	150Ω	½	32.4		4th Video IF Cathode
R46	5600Ω	½	32.76	BTS-5600-5%	4th Video IF Plate 5%
R47	1000Ω	½	32.8	BTS-1000	Decoupling 20%
R48	3900Ω	½	32.73	BTS-3900-5%	Diode Load 5%
R49	470KΩ	½	32.92	BTS-470K	1st Video Amp. Grid 20%
R50	3300Ω	½	32.32	BTS-3300	1st Video Amp. Plate
R51	6800Ω	½	32.10	BTS-6800	" " "
R52	820KΩ	½	32.94	BTS-820K-5%	2nd Video Amp. Grid 5%
R53	1.2 Meg.	½	32.96	BTS-1.2Meg-5%	Bias Network 5%
R54	330Ω	½	32.67		2nd Video Amp. Cathode
R55	3300Ω	1	32.72	BTA-3300	Voltage Dropping
R56	10KΩ	½	32.80	BTS-10K	Sync. Isolation
R57	100KΩ	½	32.89	BTS-100K	Picture Tube Grid 20%
R58	1 Meg.	½	32.33	BTS-1 Meg.	Diode Load 20%
R59	47KΩ	½	32.87	BTS-47K	Bias Network
R60	150KΩ	½	32.90	BTS-150K	" " "
R61	100Ω	½	32.2		1st Sound IF Cathode 20%
R62	10000Ω	½	32.8	BTS-1000	1st Sound IF Decoupling 20%
R63	470KΩ	½	32.92	BTS-470K	2nd Sound IF Grid 20%
R64	100Ω	½	32.2		2nd Sound IF Cathode 20%
R65	3300Ω	½	32.32	BTS-3300	2nd Sound IF Screen 20%
R66	10000Ω	½	32.8	BTS-1000	2nd Sound IF Plate 20%
R67	22KΩ	1	32.83	BTS-22K	3rd Sound IF Grid
R68	10KΩ	1	32.79	BTA-10K	Voltage Dropping
R69	10KΩ	½	32.11	BTS-10K	Bleeder
R70	100KΩ	½	32.89	BTS-100K	Diode Load
R71	100KΩ	½	32.89	BTS-100K	" "
R72	22KΩ	½		BTS-22K	De-emphasis 20%
R73	2.22	1	32.61	BW-½-2.2	Filament Dropping
R74	10 Meg.	½	32.99	BTS-10 Meg.	1st Audio Grid 20%
R75	330KΩ	½	32.19	BTS-330K	1st Audio Plate 20%
R76	270KΩ	½	32.44	BTS-270K	Audio Output Grid
R77	1100Ω	5		AB-1100	Filter See Note 2
R79	6.8 Meg.	½	32.46	BTS-6.8 Meg.	Bias Network
R80	1 Meg.	½	32.33	BTS-1 Meg.	1st Sync. Amp. Grid 20%
R81	4700Ω	1	32.74	BTA-4700	1st Sync. Amp. Plate
R82	4700Ω	1	32.74	BTA-4700	1st Sync. Amp. Plate
R83	1 Meg.	½	32.33	BTS-1 Meg.	Sync. Sep. Grid
R84	4.7 Meg.	½	32.98	BTS-4.7 Meg.	Bias Network
R85	680Ω	½	32.10	BTS-680	1st Sync. Amp. Plate
R86	1 Meg.	½	32.33	BTS-1 Meg.	2nd Sync. Amp. Grid 20%
R87	4700Ω	½		BTS-4700	2nd Sync. Amp. Plate
R88	1000Ω	½	32.8	BTS-1000	Decoupling
R89	22KΩ	½	32.83	BTS-22K	Differentiator 20%
R90	22KΩ	½	32.83	BTS-22K	Integrator 20%
R91	8200Ω	½	32.77	BTS-8200	"
R92	8200Ω	½	32.77	BTS-8200	"
R93	1.5 Meg.	½	32.97	BTS-1.5 Meg. -5%	Vert. Osc. Grid 5%
R94	220KΩ	½	32.91	BTS-220K	Vert. Osc. Plate
R95	100KΩ	½	32.89	BTS-100K	Voltage Divider
R96	2.2 Meg.	½	32.34	BTS-2.2 Meg.	"
R97	2.2 Meg.	½	32.34	BTS-2.2 Meg.	Vert. Output Grid
R98	56KΩ	½	32.88	BTS-56K	Vert. Osc. Plate
R99	8200Ω	½	32.78	BTS-8200-5%	Peaking 5%
R100	1800Ω	1		BTS-1800	Vert. Output Cathode
R101	10KΩ	1	32.79	BTA-10K	Vert. Output Plate 20%
R102	470KΩ	½	32.92	BTS-470K	Diode Load
R103	470KΩ	½	32.92	BTS-470K	" "
R104	1 Meg.	½	32.33	BTS-1 Meg.	" "
R105	470KΩ	½	32.92	BTS-470K	AFC Grid 20%
R106	560Ω	½	32.68	BTS-560	AFC Grid Current Limiting
R107	10Ω	½	32.63		AFC Cathode 5%
R108	27KΩ	1	32.85	BTA-27K	Bleeder
R109	18KΩ	1	32.86	BTA-18K	AFC Screen Dropping
R110	47KΩ	1	32.15	BTA-47K-5%	AFC Plate 5%
R111	39KΩ	1	32.86	BTA-39K-5%	AFC Plate 5%
R112	27KΩ	½	32.84	BTS-27K	Horiz. Osc. Grid
R113	10KΩ	1	32.79	BTA-10K	Horiz. Osc. Screen
R114	5000Ω	5	117.18	AB-5000	Horiz. Osc. Plate
R115	6800Ω	2	32.10	BTS-6800	Differentiator
R116	220KΩ	½	32.91	BTS-220K	Horiz. Discharge Grid 20%
R117	680KΩ	½	32.93	BTS-680K-5%	Horiz. Discharge Plate 5%
R118	6800Ω	½	32.10	BTS-6800	Peaking
R119	470KΩ	½	32.92	BTS-470K	Horiz. Output Grid
R120	100Ω	1	32.55		Horiz. Output Cathode
R121	22KΩ	1	32.13	BTA-22K	Horiz. Output Screen
R122	18KΩ	1	32.82	BTA-18K	" " "
R123	650Ω	50	117.16		Damping See Note 1
R124	1 Meg.	1	32.95	BTA-1 Meg.	High Volt. Filter
R125	1800Ω	1	32.69	BTA-1800	Focus Coil Shunt
R126	2700Ω	2	32.66	BW-2-270	" " "
R127	1560Ω	17	117.20		Bleeder Network
B	230Ω	10			" "
R128A	6750Ω	3.2	117.21		" "
B	12Ω	½			" "
C	95Ω	½			" "
R130	3.32	1	32.62	BW-½-3.3-5%	High Voltage Rectifier Filament 5%
R131	10KΩ	1	32.11	BTS-10K	Mixer Grid Coil Shunt
R132	150KΩ	½	32.90	BTS-150K	ACC. Anode Dropping
R133	27KΩ	1	32.84	BTS-27K	Tone Compensation

Note 1. This resistor is tapped at 500Ω & 1000Ω.

Note 2. Some models may use two 2200Ω 2W resistors in parallel in this application.

FADA MODELS TV30, 799, 899, 930, 940

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	FADA PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.
T1	117VAC @ 2.5A	670VAC @ 300MA	12VAC @ 5.4A	5VAC @ 6A SEC. 4 5VAC @ 2A	42.12	P-8152	TP-365	P-3061

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	SEC.	REPLACEMENT DATA FADA PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	NOTES
T2	165Ω	1310Ω	42.15	A-8121	TB0-1	A-4000	Vert.Block.Osc.Trans.
T3	600Ω	6.5Ω	42.14	A-8115	TS0-1	A-3035	Vert. Output Trans.
T4	37Ω	35Ω tapped @ 9.5Ω	37.104				Hor.Sync.Disc.Trans.
T5	420Ω tapped @ 180Ω	10.6Ω tapped @ .6Ω SEC. 2 0Ω	42.103				Hor. Output Trans.
T6	247Ω		37.102	FC-10			Focus Coil
T8A	68Ω		37.101	DY-1			Vert. Deflection Yoke
B	14Ω						Hor. Deflection York

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	SEC.	DC RES. PRI.	SEC.	REPLACEMENT DATA FADA PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	INSTALLATION NOTES
T9	7300Ω	3.2Ω	480Ω	.7Ω		A-3878	RO-9	A-2931	

SPEAKER

ITEM No.	RATING FIELD RES.	V. C. IMP.	REPLACEMENT DATA FADA PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	PM	3.2Ω				

FILTER CHOKE

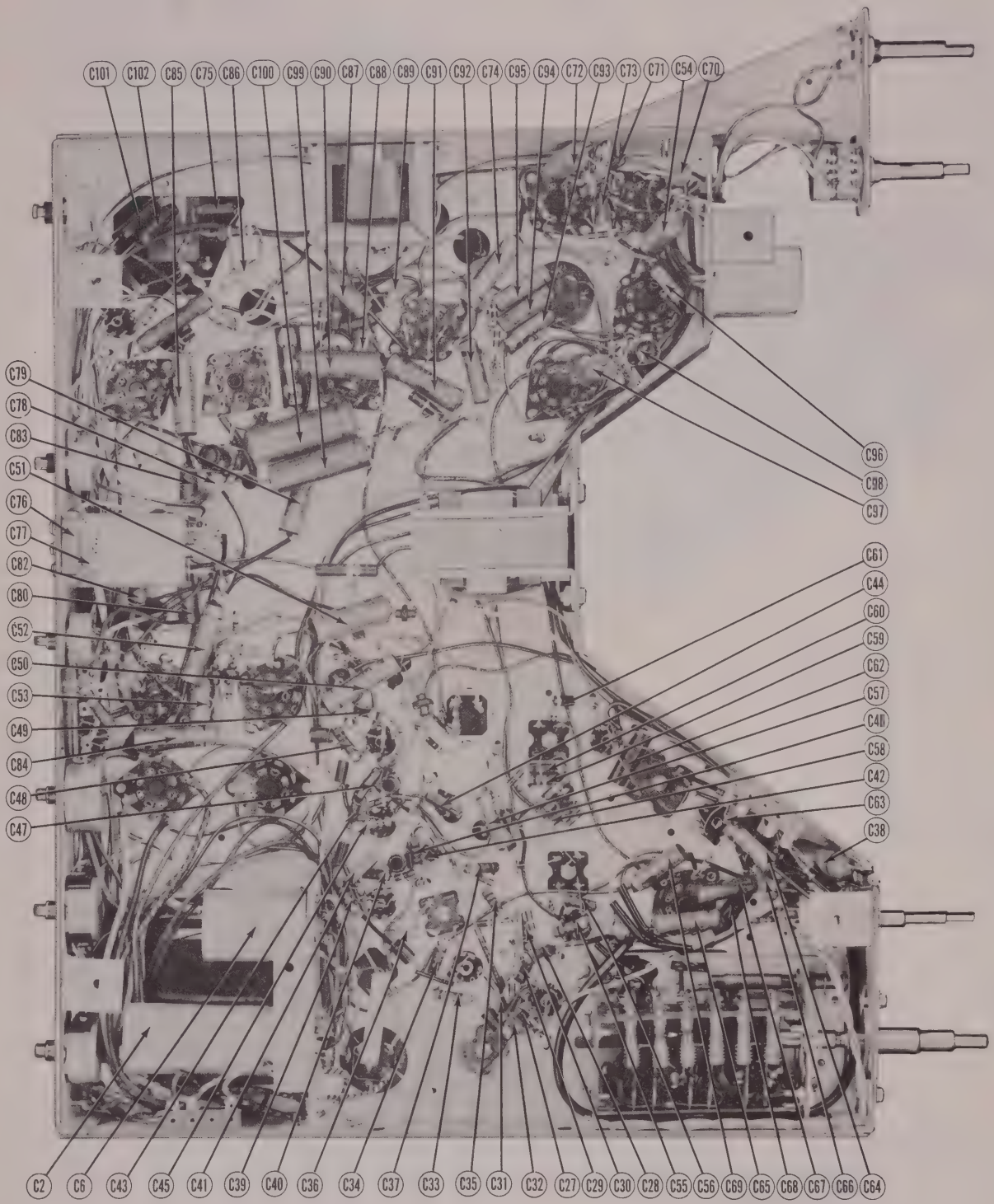
ITEM No.	RATINGS TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ↶)	REPLACEMENT DATA FADA PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	INSTALLATION NOTES
L1	300MA	50Ω	3 Henries		C-2326*	TR-3300	C-2991	* Redrill new mounting hole.

COILS (RF-IF)

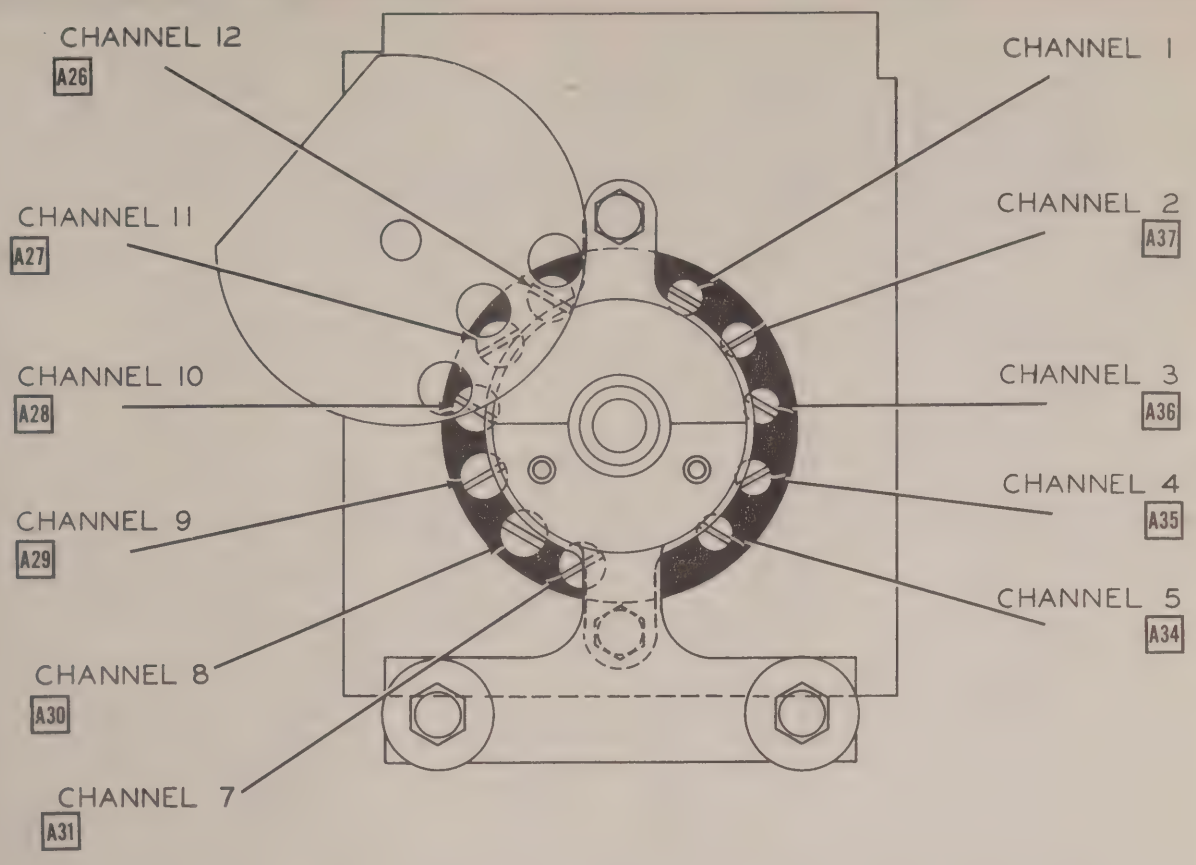
ITEM No.	USE	DC RES. PRI.	SEC.	REPLACEMENT DATA FADA PART No.	MEISSNER PART No.	NOTES
L2	Ant. Trans.	0Ω				Part of tuner assy.
L3	Interference Trap	0Ω				" " " "
L4	"	0Ω				" " " "
L5	Fil. Choke	0Ω		37.89		" " " "
L6	Mixer Grid	.1Ω				
L7	1st Video			37.96		
	IF & Sound Trap	.2Ω		37.89		" " " "
L8	Fil. Choke	0Ω				
L9	2nd Video			37.97		
	IF	.2Ω	0Ω	37.89		
L10	Fil. Choke	0Ω				
L11	3rd Video			37.99		
	IF	.2Ω	0Ω	37.89		
L12	Fil. Choke	0Ω				
L13	4th Video			37.100		
	IF	.2Ω		37.198		
L14	Sound Trap	.1Ω		37.89		
L15	Fil. Choke	0Ω				
L16	5th Video					
	IF	.1Ω		37.89		
L17	Fil. Choke	0Ω				
L18	Peaking	6Ω				Wound on 39KΩ resistor, 180 Microhenry.
L19	Peaking	8Ω				250 Microhenry
L20	Peaking	5Ω				Wound on 22KΩ resistor, 120 Microhenry.
L21	Peaking	4Ω				93 Microhenry
L22	Peaking	5Ω				Wound on 22KΩ resistor, 120 Microhenry
L23	Peaking	4Ω				93 Microhenry
L24	1st Sound					
	IF	.1Ω	0Ω	37.94		
L25	2nd Sound					
	IF	.1Ω	0Ω	37.94		
L26	Sound Disc. Trans.	0Ω	0Ω	37.95		
L27	Hor. Width Control	.6Ω		37.106		
L28	Hor. Linearity Cont.	37Ω		37.105		

MISCELLANEOUS

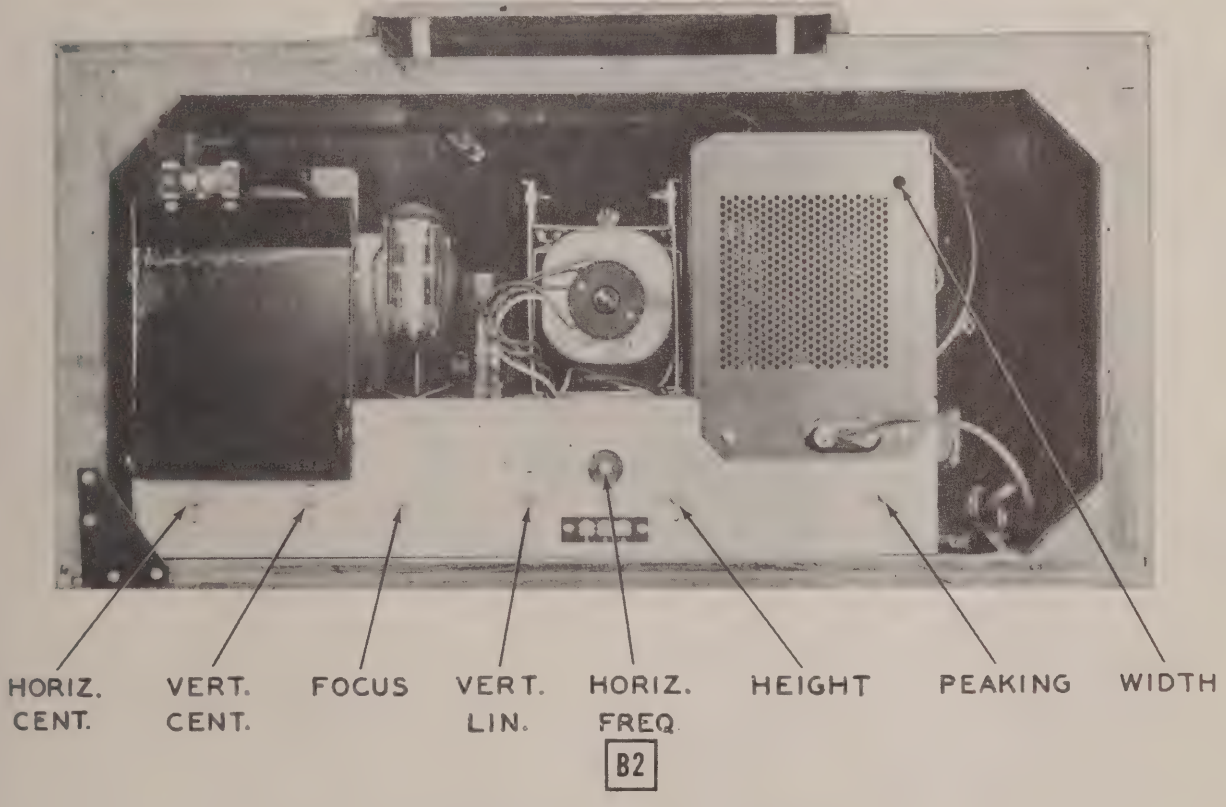
ITEM No.	PART NAME	FADA PART No.	NOTES
M2	Fuse		AGC 1/4 Amp.
M3	Tuner Assy.	42.21	Complete unit
M4	Power Cord	92.115	
M5	Receptacle		Power Interlock Plug
M6	Terminal Board	152.28	(3 Terminals with Link)
M7	Terminal Board	152.27	Antenna (2 Terminals)



CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION



RF OSCILLATOR ALIGNMENT POINTS



CABINET-REAR VIEW

HORIZONTAL OSCILLATOR ALIGNMENT

HORIZONTAL OSCILLATOR ALIGNMENT CHECK:

While receiving a television signal turn the horizontal hold control fully counter-clockwise. Remove the picture momentarily by turning the contrast control fully counter-clockwise and then return it to its normal operating position. The picture should pull back into synchronization.

Now turn the horizontal hold control fully clockwise. Remove the picture momentarily by turning the contrast control fully counter-clockwise and then return to its normal operating position. The picture should pull back into synchronization.

If receiver synchronizes properly under these checks it is not necessary to align the horizontal oscillator. However, if the picture is not normal or stable, the horizontal oscillator must be aligned.

SLIGHT RETOUCH ALIGNMENT

If the receiver failed in the above check at either extreme of the hold control, it may be possible to align the horizontal oscillator by making slight adjustments.

Tune in a TV station and adjust fine tuning for best sound quality. Adjust vertical hold control to vertically synchronize the picture. Adjust the contrast control to slightly less than normal. Turn the horizontal hold control to the extreme position in which the oscillator falls out of synchronization. Momentarily remove the signal. Adjust B_2 (rear of chassis) until the oscillator pulls into synchronization. Check hold and pull-in as outlined above.

COMPLETE ALIGNMENT

Tune in a TV station for the best sound quality. Adjust vertical hold control to vertically synchronize the picture. Adjust the contrast control to slightly less than normal.

Adjust B_1 until the blanking bar, which may appear in the picture, moves to the right and off the raster. If ripples occur in the raster turn B_1 in a clockwise direction until the unstable condition is removed. The length of this adjustment screw in its correct position is usually about 1/2 inch beyond the bushing.

Turn horizontal hold control fully counter-clockwise and adjust B_2 clockwise until picture fails to synchronize. Now slowly turn B_2 counter-clockwise to the point where the picture synchronizes. Readjust B_1 so that the left side of the picture is close to the left side of the raster but does not fold over.

Turn the horizontal hold control fully clockwise. The right side of the picture should be close to the right side of the raster, but should not fold over. If it does, readjust B_1.

Momentarily remove the signal. When signal is restored, the picture should fall into synchronization. If it does not, turn B_2 counter-clockwise until picture falls into synchronization.

Turn horizontal hold control fully counter-clockwise. Picture should fall back into synchronization after momentary removal of the signal.

If picture fails to synchronize after momentary removal of the signal at both extremes of the horizontal hold control, there may be insufficient pull-in range. However, if picture will pull in through 3/4 of the hold control range, operation should be satisfactory as excessive pull-in is objectionable. Excessive pull-in makes the control circuits more sensitive which may result in their being triggered by noise pulses. Also the vertical synchronizing and equalizing pulses may cause a bend in the upper part of the picture.

LINEARITY ADJUSTMENTS

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.

Adjust the HEIGHT control until picture fills mask vertically (6 3/8 inches). Adjust VERTICAL LINEARITY for best linearity top to bottom. Readjust the HEIGHT control for proper height. The two controls are interacting and adjustment of one will require readjustment of the other. Adjust vertical centerring to center picture vertically.

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS.

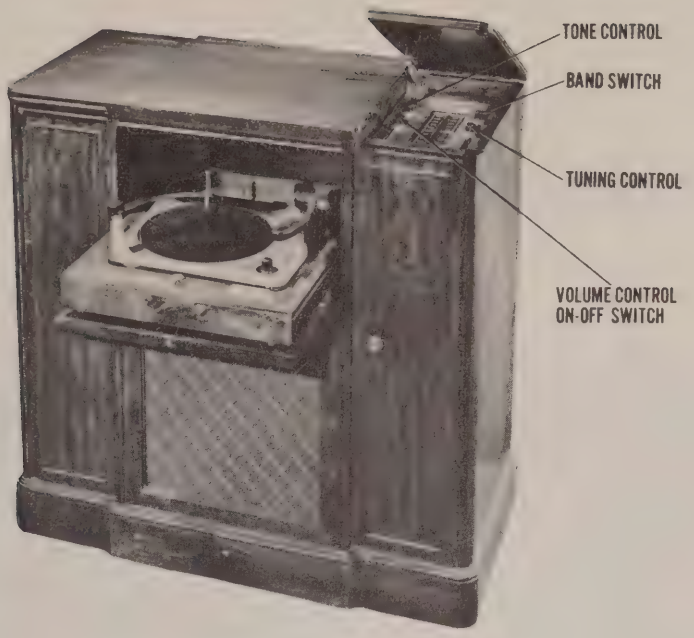
Turn the horizontal peaking control clockwise as far as possible without crowding the right side of picture. This provides maximum voltage to picture tube second anode. Adjust width control until raster fills the mask horizontally (8 1/2 inches). Adjust the horizontal linearity control until picture is symmetrical left to right. (It may be necessary to slightly readjust the horizontal peaking control). Adjust the horizontal centering control to center picture horizontally.

If continued adjustments of the peaking, width and linearity controls fail to give proper linearity, it may be necessary to move the tap on R123 which is located in the high voltage compartment. After this tap is moved, it will be necessary to readjust the peaking, width and linearity controls.

DISASSEMBLY INSTRUCTIONS

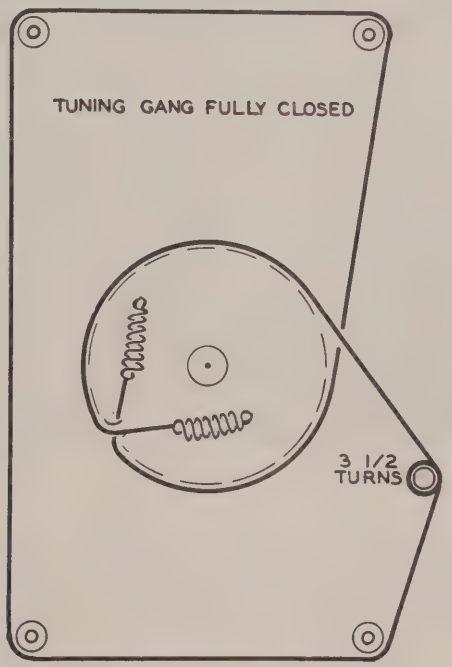
1. Remove eight push-on type control knobs.
2. Remove nine screws holding back cover. Remove back cover.
3. Remove speaker plug from speaker.
4. Remove five 7/16" hex head bolts holding chassis.
5. Remove two wood screws from rear of picture tube top cover. Remove cover.
6. Remove two wood screws holding picture tube front cover. Remove cover.
7. Loosen two screws holding each clamp at top of picture tube. Pull picture tube out front of cabinet.
8. Remove chassis by pulling out back of cabinet.
9. Remove four 1/4" hex nuts holding speaker. Remove speaker.

CAUTION: REMOVE PICTURE TUBE BEFORE REMOVING CHASSIS.



FIRESTONE MODEL 4-A-66

TRADE NAME	Firestone, Model 4-A-66 (Code No. 177-8-4A66)
SUPPLIER	The Firestone Tire and Rubber Co., Akron, Ohio
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver with Loop Antenna
TUBES(TWELVE)	Types 6AG5 RF Amp., 12AT7 FM Converter, 6BE6 AM Converter, 6SK7 1st IF Amp., 6SK7 2nd IF Amp., 6SK7 3rd IF Amp., 6T8 DET-AVC-AF, 6SQ7 Phase Inverter-Gas Gate, (2) 6V6GT Power Output, 6SC7 Pre-Amp., 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING: .82 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC — FREQ. MOD. 87.5-108.5MC



DIAL CORD DRIVE

FIRESTONE MODEL
4-A-66 (Code No. 177-8-4A66)

FIRESTONE MODEL
4-A-66 (Code No. 177-8-4A66)

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

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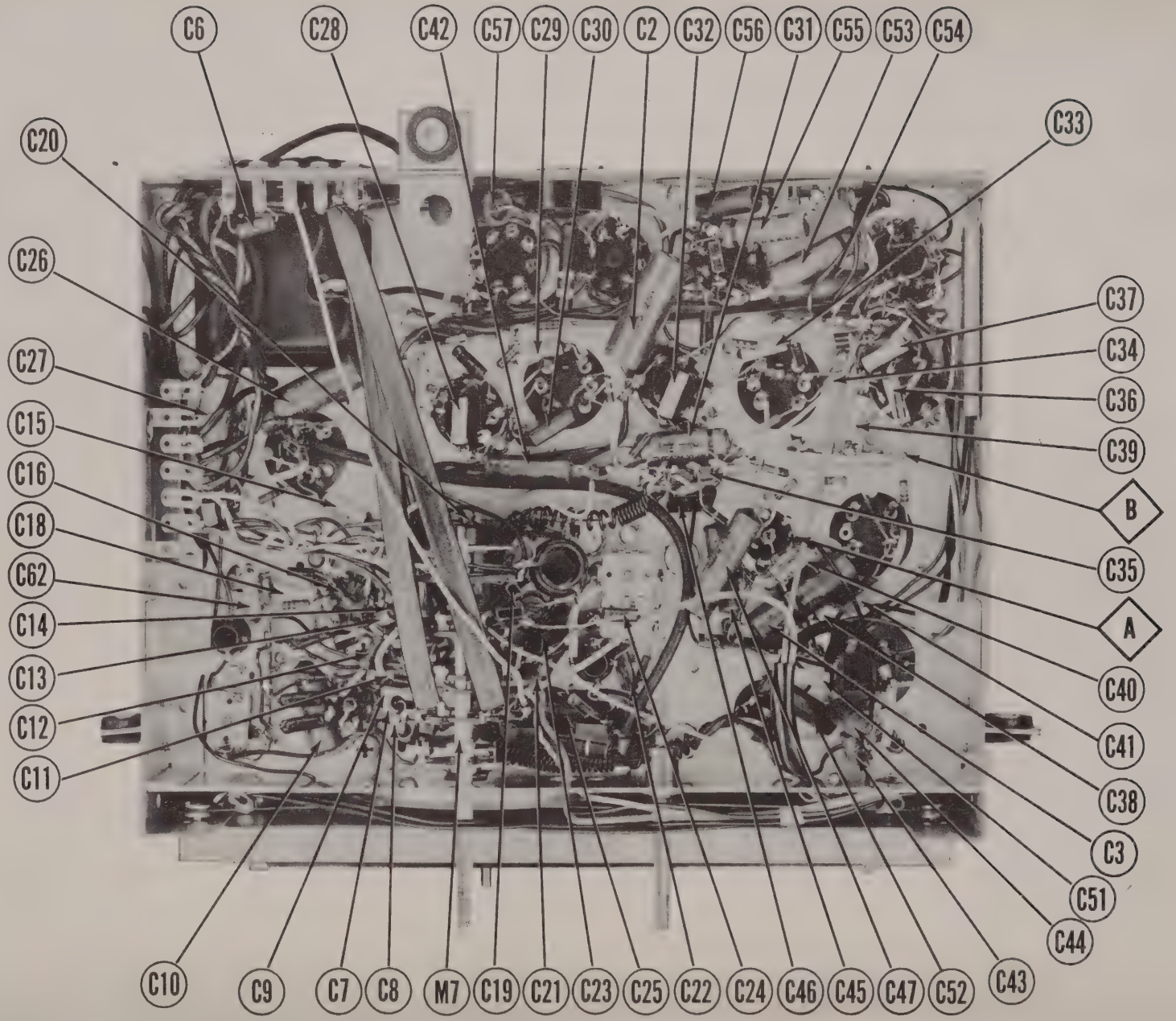
DATE 10/49 SET #74 FOLDER #4


C6
C28
C42
C57
C29
C30
C2
C32
C56
C31
C55
C53
C54
C33
C20
C26
C27
C15
C16
C18
C62
C14
C13
C12
C11
C37
C34
C36
C39
B
C35
A
C40
C41
C38
C3
C51
C44
C43
C52
C47
C45
C46
C24
C22
C25
C23
C21
C19
M7
C8
C7
C9
C10

R43
R57
L21
R55
R31
R32
R34
R28
R36
R35
R33
R37
R40
R42
R41
R26
R27
R44
L20
R45
R46
R25
R24
R23
R47
R22
R21
R56
L19
R20
R3
R38
L22
R39
R29
R30
R17
L12
R18
R15
L8
R14
R8
R7
R4
R9
L17
L5
R19
R11
R16
R10
R5
R12
L3
R13
L18
R6

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	FM Converter	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	1st IF Amp.	6SK7	6SK7	8N	
V5	2nd IF Amp.	6SK7	6SK7	8N	
V6	3rd FM IF Amp.	6SK7	6SK7	8N	
V7	DET-AVC-AF	6T8	6T8	9E	
V8	Phase Inv.- Gas Gate	6SQ7	6SQ7	8Q	
V9	Power Output	6V6GT	6V6GT	7AC	
V10	Power Output	6V6GT	6V6GT	7AC	
V11	Pre Amp.	6SC7	6SC7	8S	
V12	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	450	25424	AF4444J*	UP		EL-420*	▲ Filter
B	20	450			222245*			■ Filter
C	20	450						▲ Filter
C2	25	25	25158	PRS25/25	BR252A		TA-25	Output Cath. Bypass
C3	4	100	25270	PRS150/4	BR415		UT-41	Stabilizing Cap.
C4A	20	450	25463	AF44J	UP2245		EL-220	▲ Decoupling
B	20	450						■ Decoupling
C5	47	500	25193	1469-00005	5R5Q5	NPOM-50	MS-45	Fixed Trimmer
C6	20		25492		5R5Q2	NPOK-20	MS-42	Fixed Trimmer
C7	240		25427	1468-00025	5W5T25	GP2K-250	1FM-325	RF Coupling
C8	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	AVC Filter
C9	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Cath. Bypass
C10	.05	200	25181	P288-05	GT2S5		TM-15	RF Cath. Bypass
C11	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Screen Bypass
C12	50		25493	1468-00005	5W5Q5	GP1K-50	1FM-45	RF Coupling
C13	40		25507	1469-00004	5R5Q4		MS-44	Fixed Trimmer
C14	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	Mixer Cath. Bypass
C15	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	Mixer Plate Dec.
C16	1		25497	1468-000001				Osc. Coupling
C17	30		25329	1468-00004	5W5Q3	GP1K-33	MS-43	Osc. Grid Cap
C18	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	Osc. Plate Bypass
C19	1		25497	1468-000001				RF Coupling
C20	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Plate Decoupling
C21	.05	200	25181	P288-05	GT2S5		TM-15	AVC Filter
C22	50	500	25193	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Grid Cap
C23	480	500	25504					Fixed Padder
C24	20		25492		5R5Q2	NPOK-20	MS-42	Fixed Trimmer
C25	.01	600	25186	P688-01	GT6S1	GP2-335-01	TM-11	Osc. Anode Bypass
C26	.05	600	25181	P688-05	GT6S5		TM-15	Conv. Plate Dec.
C27	.1	200	25182	P288-1	GT2P1		TM-1	AVC Filter
C28	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	1st IF Screen Byp.
C29	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	1st IF Plate Dec.
C30	1500	500	25273	1467-0015	1W5D15	GP2L-0015	1FM-215	AVC Filter
C31	.05	200	25181	P288-05	GT2S5		TM-15	2nd IF Cath. Bypass
C32	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd IF Screen Bypass
C33	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd IF Plate Dec.
C34	100	500	25188	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C35	100	500	25188	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C36	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd IF Cath. Bypass
C37	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd IF Screen Bypass
C38	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd IF Plate Dec.
C39	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd IF Decoupling Note
C40	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C41	100	500	25188	1468-0001	5W5T1	GP1K-100	1FM-31	Diode Load Cap.
C42	.003	600	25184	P688-003	GT6D3	GP2M-003	TM-23	De-emphasis
C43	47	500	25193	1468-00005	5W5Q5	GP1K-47	1FM-45	RF Bypass
C44	.01	400	25186	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C45	.01	600	25186	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C46	100	500	25188	1468-0001	5W5T1	GP1K-100	1FM-31	AF Plate Bypass

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	IDENTIFICATION CODES
R32	220Ω	½	77186	BW-½-220	3rd FM IF Cathode
R33	1000Ω	½	77233	BTS-1000	3rd FM IF Plate Decoupling
R34	33KΩ	½	77183	BTS-33K	3rd FM IF Screen
R35	1000Ω	½	77233	BTS-1000	Decoupling
R36	22KΩ	½	77169	BTS-22K	De-emphasis
R37	220KΩ	½	77178	BTS-220K	AVC Network
R38	15KΩ	½	77246	BTS-15K	Ratio Det. Diode Load
R39	10 Meg.	½	77182	BTS-10 Meg.	AF Grid
R40	220KΩ	½	77178	BTS-220K	AF Plate
R41	4.7 Meg.	½	77187	BTS-4.7 Meg	Delayed AVC
R42	10 Meg.	½	77182	BTS-10 Meg.	Phase Inv. Grid
R43	220KΩ	½	77178	BTS-220K	Phase Inv. Plate
R44	220KΩ	½	77178	BTS-220K	Output Grid
R45	220KΩ	½	77178	BTS-220K	Output Grid
R46	220KΩ	½	77178	BTS-220K	Output Grid
R47	270Ω	1	77174	BW-1-270	Output Cathode Wire Wound
R48	10KΩ	½	77180	BTS-10K	Tone Compensation
R49	3.3 Meg.	½	77223	BTS-3.3 Meg	Pre-Amp. Grid
R50	3.3 Meg.	½	77223	BTS-3.3 Meg	Pre-Amp. Grid
R51	100KΩ	½	77201	BTS-100K	Pre-Amp. Plate
R52	15KΩ	½	77246	BTS-15K	Filter
R53	100KΩ	½	77201	BTS-100K	Pre-Amp. Plate
R54	15KΩ	½	77246	BTS-15K	Filter
R55A	1000Ω	10	77463	AB-1000	Filter Wire Wound
B	400Ω	10		AB-400	Filter Wire Wound
R56	15Ω	½	77491	BW-½-15	Bias Network
R57	3.3Ω	1	77492	BW-1-3.3	Filament Dropping

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	630VCT	5VAC	6.3VAC	94262	P-6013#§	P-2953#§	PH-120#
	ⓐ .82A	.109A DC	ⓐ 2A	ⓐ 4.2A				

Drill New Mounting Holes.
§ Add Series Resistor To Reduce Plate Voltage.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: FIRESTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T2	10KΩ CT	4Ω	610Ω CT	.4Ω	94239	A-3870	A-2904	RO-110	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V.C. IMP.		ST-104		
SP1	PM	7.1Ω	81189	MOD.P8-S ST-120‡	8A4	
SP2	PM	7.6Ω	13882	MOD.P10-S	10A4	‡ Remount Output Transformer
	CONE DIA.	V.C. DIA.				
SP3	7 3/8"	1"				
SP4	9 3/8"	1"				

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C47	.02	600	25195	P688-02	GT6S2		TM-12	Audio Coupling
C48	470	500	25285	1468-0005	5W5T5	GP2K-470	1FM-35	Tone Compensation
C49	.01	600	25194	P688-01	GT6S1	GP2-335-01	TM-11	Tone Compensation
C50	.005	600	25031	P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C51	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	Filament Bypass Note
C52	.01	400	25186	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C53	.01	600	25186	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C54	.02	600	25195	P688-02	GT6S2		TM-12	Audio Coupling
C55	.003	600	25184	P688-003	GT6D3		TM-23	Output Plate Bypass
C56	.003	600	25184	P688-003	GT6D3		TM-23	Output Plate Bypass
C57	.005	600	25031	P688-005	GT6D5		TM-25	Line Filter
C58	.05	200	25181	P288-05	GT2S5		TM-15	Audio Coupling
C59	.005	200	25031	P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C60	.01	600	25186	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C61	.003	600	25184	P688-003	GT6D3	GP2M-003	TM-23	Audio Coupling
C62	1500		25273	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass Note

* Parallel Sections To Obtain Desired Capacity.
Note. Not Used In All Models.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES	
R1A	3.2 Meg	½	78158			Volume control	(Dual)
B	3.2 Meg	½				Volume control and switch	(Control)
R2A	500KΩ	½	78159			Treble control	(Dual)
B	3.2 Meg	½				Bass control	(Concentric)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FIRESTONE PART No.	IRC PART No.	IDENTIFICATION CODES
R3	220KΩ	½	77178	BTS-220K	Ant. Isolation
R4	220Ω	½	77186	BW-½-220	RF Cathode
R5	1000Ω	½	77233	BTS-1000	RF Plate Decoupling
R6	33KΩ	½	77183	BTS-33K	RF Screen
R7	1 Meg.	½	77181	BTS-1 Meg.	AVC Network
R8	1 Meg.	½	77181	BTS-1 Meg.	AVC Network
R9	2200Ω	½	77184	BTS-2200	FM Conv. Grid
R10	1000Ω	½	77233	BTS-1000	FM Conv. Plate Decoupling
R11	100KΩ	½	77201	BTS-100K	FM 1st IF Transformer Shunt
R12	10KΩ	½	77180	BTS-10K	FM Osc. Grid
R13	1000Ω	½	77233	BTS-1000	FM Osc. Plate Decoupling
R14	100KΩ	½	77201	BTS-100K	AVC Network
R15	47Ω	½	77219		Parasitic Supp.
R16	1000Ω	½	77233	BTS-1000	AM Conv. Plate Decoupling
R17	22KΩ	½	77169	BTS-22K	AM Osc. Grid
R18	10KΩ	1	77022	BTA-10K	AM Osc. Plate
R19	1 Meg.	½	77181	BTS-1 Meg.	1st IF Grid
R20	68Ω	½	77245	BW-½-68	1st IF Cathode
R21	33KΩ	½	77183	BTS-33K	1st IF Screen
R22	1000Ω	½	77233	BTS-1000	1st IF Plate Decoupling
R23	100KΩ	½	77201	BTS-100K	2nd FM IF Transformer Shunt
R24	68Ω	½	77245	BW-½-68	2nd IF Cathode
R25	22CΩ	½	77186	BW-½-220	2nd IF Cathode
R26	1000Ω	½	77233	BTS-1000	2nd IF Plate Decoupling
R27	33KΩ	½	77183	BTS-33K	2nd IF Screen
R28	47KΩ	½	77172	BTS-47K	Diode Filter
R29	470KΩ	½	77173	BTS-470K	Diode Load
R30	1 Meg.	½	77181	BTS-1 Meg.	AVC Network
R31	100KΩ	½	77201	BTS-100K	3rd FM IF Transformer Shunt

DATE 10/49 SET #74 FOLDER #4

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

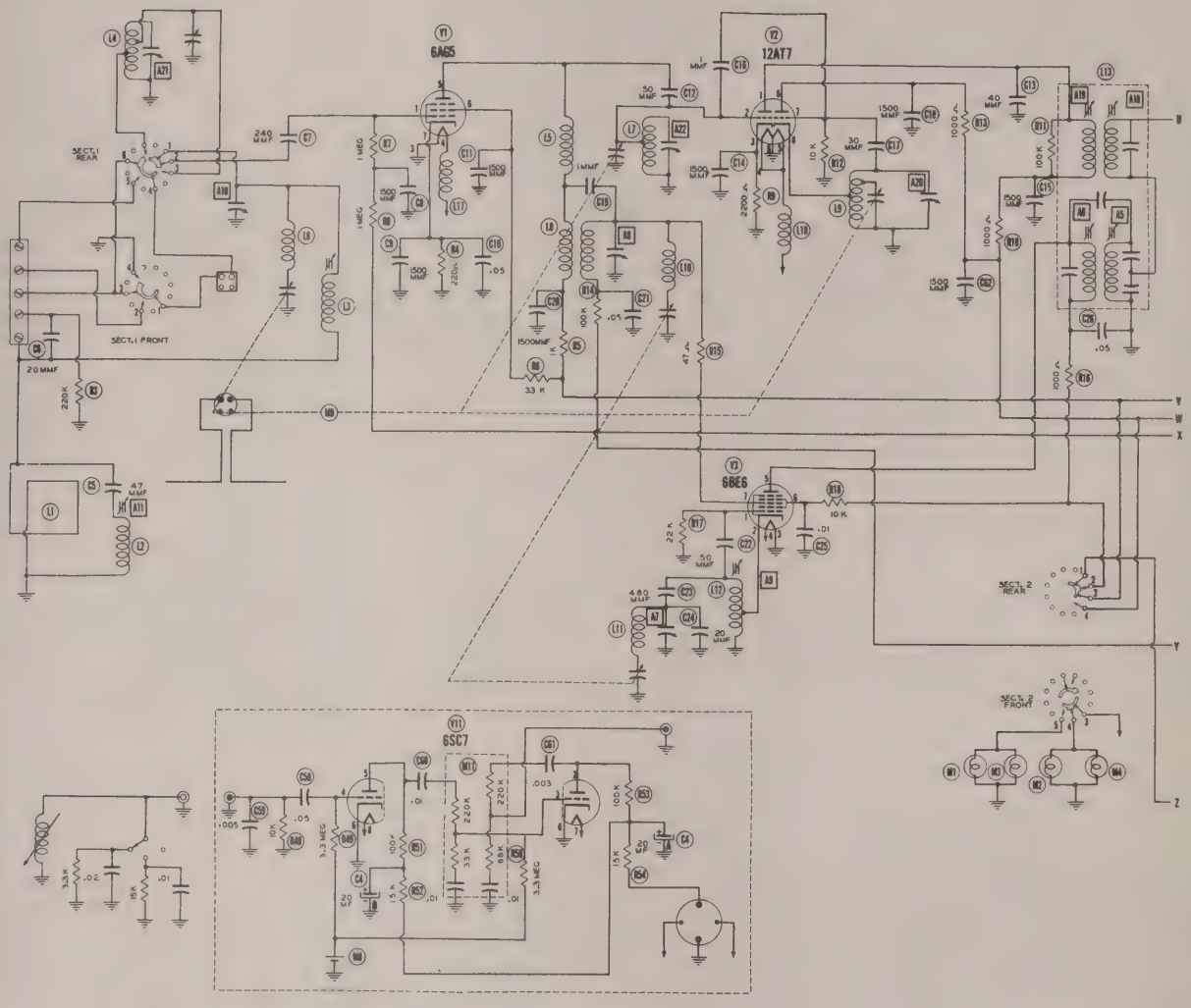
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA MEISSNER PART No.
L1	AM Loop Ant.	1Ω		13883	
L2	Wave Trap	13Ω		38996	
L3	Ant. Loading	3Ω		38963	
L4	FM Ant.Coil	0Ω		38958	
L5	RF Choke	.2Ω		38884	
L6	RF Choke	.2Ω		38884	
L7	FM RF Coil	0Ω		38959	
L8	AM RF Coil	70Ω	3.5Ω	38961	
L9	FM Osc.Coil	0Ω		38960	
L10	RF Choke	.2Ω		38884	
L11	RF Choke	.2Ω		38884	
L12	AM Osc.Coil	3Ω		38962	14-1060
L13A	FM 1st IF	.5Ω		38957	
B	AM 1st IF	9Ω			
L14A	FM 2nd IF	.5Ω		38950	
B	AM 2nd IF	9Ω			
L15A	FM 3rd IF		.5Ω	38951	
B	AM 3rd IF	9.5Ω	9.5Ω		
L16	Ratio Det.	1.5Ω	.2Ω	38952	
L17	Filament Choke	.2Ω		38884	
L18	Filament Choke	.2Ω		38884	
L19	Filament Choke	.2Ω		38884	
L20	Filament Choke	.2Ω		38884	
L21	Filament Choke	.2Ω		38884	
L22	Filament Choke	.2Ω		38884	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA FIRESTONE PART No.	NOTES
M1	Bayonet	6-8	.25	Blue	42185	Type #44
M2	Bayonet	6-8	.25	Blue	42185	Type #44
M3	Bayonet	6-8	.25	Blue	42185	Type #44
M4	Bayonet	6-8	.25	Blue	42185	Type #44
M5	Bayonet	6-8	.25	Blue	42185	Type #44
M6	Bayonet	6-8	.15	Brown	42186	Type #47

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M7	Switch	90269	Band
M8	Bias Cell	95005	
M9	3 Gang Var. Cap.	17210	(15-514MMF) Each Section
M10	Printed Circuit	77462	
M11	Equalizer Assby.	13869	
A7, A8	Dual Trimmer	26278	BC Osc. Adj. / BC RF Adj.
A10	Trimmer	26279	BC Ant. Adj.
A20	Trimmer	26231	FM Osc. Adj.
A21, A22	Dual Trimmer	26280	FM RF Adj. / FM Ant. Adj.
	Dial Glass	31455	AM
	Dial Glass	31456	FM
	Dial Pointer	64479	
	Knob	59504	Tuning & Volume
	Knob	59505	Band Switch
	Knob	59503	Bass
	Knob	59502	Treble



IF= 455 KC AM

IF=10.7 MC FM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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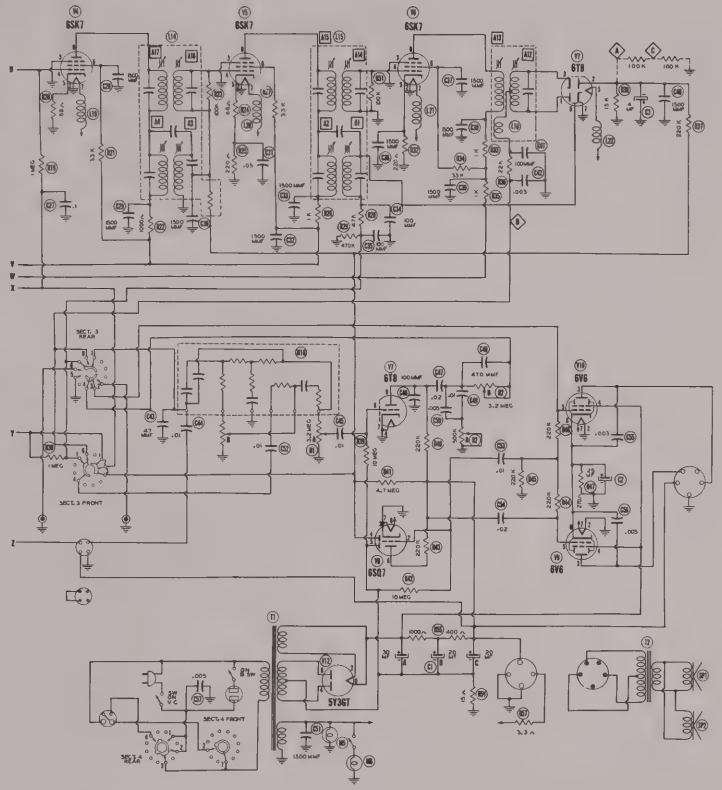

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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VOLTAGE READINGS

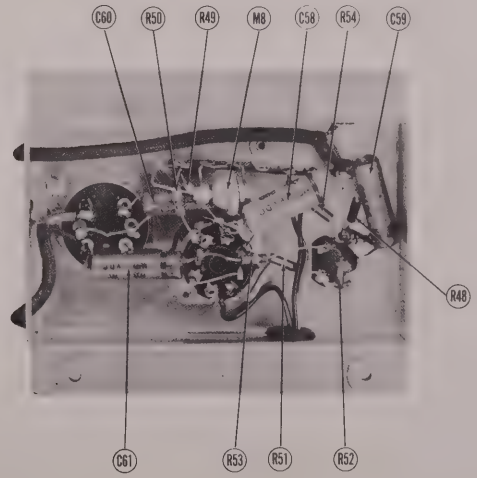
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AG5	0V	1.5VDC	0V	6.3VAC	215VDC	180VDC	1.5VDC		
‡V2	12AT7	200VDC	0V	5.2VDC	6.3VAC	6.3VAC	195VDC	§-.2VDC	0V	0V
V3	6BE6	§-8.6VDC	0V	0V	6.3VAC	220VDC	122VDC	-.2VDC		
V4	6SK7	0V	0V	0V	0V	1.1VDC	105VDC	6.3VAC	205VDC	
V5	6SK7	0V	0V	0V	.1VDC	4.5VDC	125VDC	6.3VAC	210VDC	
‡V6	6SK7	0V	0V	0V	0V	2.9VDC	105VDC	6.3VAC	180VDC	
V7	6T8	-.4VDC	-.7VDC	-.5VDC	0V	6.3VAC	-.7VDC	0V	-.6VDC	112VDC
‡ V7A	6T8	-.5VDC	-1.1VDC	-.8VDC	0V	6.3VAC	-.7VDC	0V	-.6VDC	112VDC
V8	6SQ7	0V	-.4VDC	0V	.3VDC	-1.6VDC	150VDC	6.3VAC	0V	
V9	6V6GT	0V	0V	285VDC	240VDC	0V	0V	6.3VAC	15VDC	
V10	6V6GT	0V	0V	285VDC	240VDC	0V	0V	6.3VAC	15VDC	
V11	6SC7	0V	125VDC	-.4VDC	-.4VDC	132VDC	0V	5.5VAC	0V	
V12	5Y3GT	-1.6VDC	290VDC	0V	310VAC	0V	310VAC	0V	290VDC	

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AG5	3 Meg.	220Ω	0Ω	.1Ω	†2.5KΩ	†34KΩ	220Ω		
‡V2	12AT7	†2.5KΩ	0Ω	2KΩ	.1Ω	.1Ω	†2.5KΩ	10KΩ	0Ω	0Ω
V3	6BE6	22KΩ	0Ω	0Ω	.1Ω	†2.5KΩ	†10KΩ	1.5 Meg		
V4	6SK7	0Ω	0Ω	0Ω	2.5Meg	68Ω	†34KΩ	.1Ω	†2.5KΩ	
V5	6SK7	0Ω	0Ω	0Ω	1.5Meg	280Ω	†34KΩ	.1Ω	†2.5KΩ	
‡V6	6SK7	0Ω	0Ω	0Ω	.5Ω	220Ω	†35KΩ	.1Ω	†3.5KΩ	
V7	6T8	Inf.	15KΩ	Inf.	0Ω	.1Ω	500KΩ	0Ω	10 Meg	†220KΩ
‡ V7A	6T8	Inf.	15KΩ	Inf.	0Ω	.1Ω	500KΩ	0Ω	10 Meg	†220KΩ
V8	6SQ7	0Ω	10 Meg	0Ω	230KΩ	15Ω	†220KΩ	.1Ω	0Ω	
V9	6V6GT	0Ω	0Ω	†300Ω	†1000Ω	440KΩ	220KΩ	.1Ω	270Ω	
V10	6V6GT	0Ω	0Ω	†300Ω	†1000Ω	440KΩ	Inf.	.1Ω	270Ω	
V11	6SC7	0Ω	†115KΩ	*	*	†130KΩ	0Ω	.1Ω	0Ω	
V12	5Y3GT	15Ω	140KΩ	Inf.	115Ω	Inf.	110Ω	Inf.	140KΩ	

† Measured From Pin 8 Of V12.
* Do Not Measure.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer, turn tuning gang fully closed and set pointer to reference mark on low end of FM dial scale.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

RMA dummy consists of a 200MMF capacitor in series with a 20 microhenry coil which is shunted by a 400MMF capacitor in series with a 400 ohm resistor.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (Grid) of 6BE6 (V3). Low side to chassis.	455KC (400~ Mod.)	AM (second pos. counter-clock-wise)	Point of non interference	Across voice coil	A1,A2, A3,A4 A5,A5	Adjust for maximum output.
2.	.1MFD	High side to AM RF section of tuning gang. Low side to chassis.	1500KC	"	1500KC	"	A7,A8	Adjust for maximum output.
3.	.1MFD	"	600KC	"	600KC	"	A9	Rock tuning gang and adjust for maximum output.
4.	RMA Dummy (See above)	High side thru RMA dummy to external antenna terminal. Low side to chassis.	1500KC	"	1500KC	"	A10	Adjust for maximum output.
5.	Direct	High side to external antenna terminal. Low side to chassis.	455KC	"	Tuning gang fully closed	"	A11	Adjust for minimum output.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	.001MFD	High side to pin 4 (Grid) of 6SK7 (V6). Low side to chassis.	10.7MC (450KC Sweep)	FM (extreme clock-wise)	Point of non interference	Vert.Amp. to Point (A) Low side to chassis.	A12, A13	Disconnect stabilizer cap (C3). Turn A12 fully out and adjust A13 for flat topped response as per Fig 1.
7.	.001MFD	High side to pin 4 (Grid) of 6SK7 (V5). Low side to chassis.	"	"	"	"	A14, A15	Turn A14 fully out and adjust first A15 and then A14 for flat topped response as per Fig 2.
8.	.001MFD	High side to pin 4 (Grid) of 6SK7 (V4). Low side to chassis.	"	"	"	"	A16, A17	Turn A16 fully out and adjust first A17 and then A16 for flat topped response as per Fig 3.
9.	.001MFD	High side to pin 2 (Grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A18, A19	Turn A18 fully out and adjust first A19 and then A18 for flat topped response as per Fig 3.
10.	.001MFD	"	"	"	"	Vert.Amp. to Point (B) Low side to chassis.	A12	Reconnect stabilizer cap (C3). Adjust A12 for proper curve as shown in Fig 4. Slightly retouch A13 for maximum amplitude and straightness of diagonal line.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from Point A to chassis. The junction of these two resistors is alignment Point C as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to pin 4 (Grid) of 6SK7 (V6). Low side to chassis.	10.7MC (Unmod.)	FM (extreme clock-wise)	Point of non interference	DC Probe to Point (A) Common to chassis.	A12, A13	Turn A12 fully out. Adjust A13 for maximum deflection.
7.	.001MFD	High side to pin 4 (Grid) of 6SK7 (V5). Low side to chassis.	"	"	"	"	A14, A15	Turn A14 fully out. Adjust A15 for maximum deflection. and then adjust A14 for maximum deflection.
8.	.001MFD	High side to pin 4 (Grid) of 6SK7 (V4). Low side to chassis.	"	"	"	"	A16, A17	Turn A16 fully out. Adjust A17 for maximum deflection and then adjust A16 for maximum deflection.
9.	.001MFD	High side to pin 2 (Grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A18, A19	Turn A18 fully out. Adjust A19 for maximum deflection and then adjust A18 for maximum deflection.
10.	.001MFD	"	"	"	"	DC Probe to Point (B) Common to Point (C)	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
11.	330Ω carbon res.	High side to left hand terminal of FM antenna socket. Low side to chassis.	108MC	FM	108MC	DC Probe to Point (A) Low side to chassis.	A20	Adjust for maximum deflection on first peak from maximum capacity.
12.	"	"	"	"	"	"	A21, A22	Adjust for maximum deflection.
13.	"	"	88MC	"	88MC	"		Spread or compress turns of oscillator, RF and antenna coils for maximum deflection. Repeat steps 11, 12, and 13 until no further improvement can be made.

FIG. 1

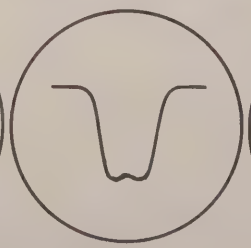


FIG.2

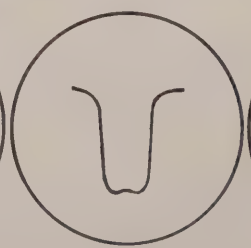


FIG.3

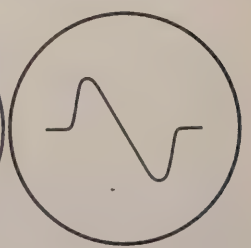


FIG. 4

KNIGHT MODEL 93-320

KNIGHT MODEL 93-320

KNIGHT MODEL 93-320

KNIGHT MODEL 93-320

TRADE NAME	Knight, Model 93-320
SUPPLIER	Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Illinois
TYPE SET	AC Operated Audio Amplifier
TUBES(SIX)	Types 6SC7 Pre Amp., 6SN7GT AF Amp., 6SL7GT AF Amp.-Phase Inverter, (2) 6L6 Power Output, 5U4G Rectifier.
POWER SUPPLY	110-130 Volts AC RATING: .92 Amp. @ 117 Volts AC

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DATE 10/49 SET #74 FOLDER #5

PARTS LIST AND DESCRIPTIONS

KNIGHT MODEL 93-320

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Pre Amp.	6SC7	6SC7	8S	
V2	AF Amp.	6SN7GT	6SN7GT	8BD	
V3	AF Amp.-Phase Inverter	6SL7GT	6SL7GT	8BD	
V4	Power Output	6L6	6L6	7AC	
V5	Power Output	6L6	6L6	7AC	
V6	Rectifier	5U4G	5U4G	5T	

CAPACITORS

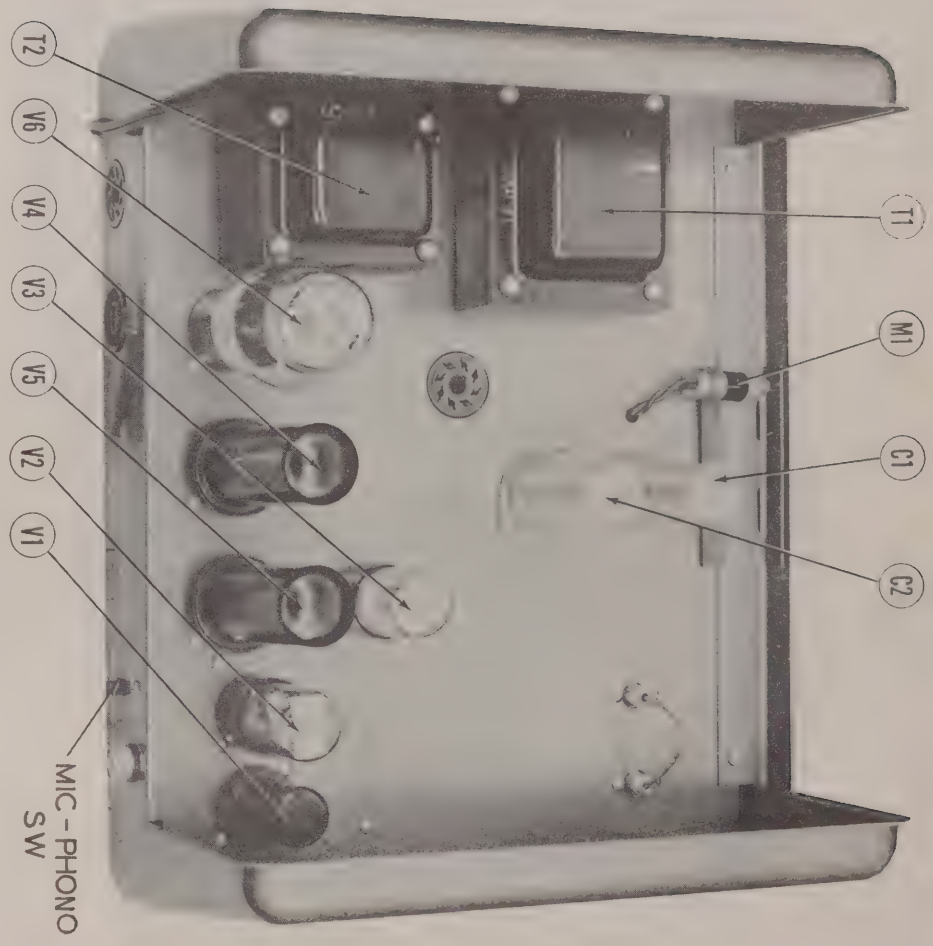
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	30	500		AF6J	UP3050		TVL-7	Filter
C2A	10	450		AF222J	UP11145		EL-310	Decoupling
B	10	450						▲ Decoupling
C	10	450						■ Decoupling
C3	8	450		PRS450/8	BR845		UT-8	Decoupling
C4	8	450		PRS450/8	BR845		UT-8	Decoupling
C5A	40	30		PRS150/40	BRD4415A		TA-440	Output Cathode Bypass
B	40	30		-40				Audio Cathode Bypass
C6	50	25		PRS50/25	BR502		TA-50	Audio Cathode Bypass
C7	50	25		PRS50/25	BR502		TA-50	Audio Cathode Bypass
C8	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C9	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C10	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C11	.005	600		P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C12	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C13	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C14	500	500		1468-0005	5W5T5	GP2K-500	1FM-35	Tone Compensation
C15	500	500		1468-0005	5W5T5	GP2K-500	1FM-35	Tone Compensation
C16	.01	600		P688-01	GT6S1	GP2-335-01	TM-11	Tone Compensation
C17	.005	600		P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C18	.005	600		P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C19	.002	600		P688-02	GT6D2	GP2M-002	TM-22	Tone Compensation
C20	.005	600		P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C21	.01	600		P688-01	GT6S1	GP2-335-01	TM-11	Tone Compensation
C22	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C23	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C24	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C25	.05	600		P688-05	GT6S5		TM-15	Audio Coupling
C26	.05	600		P688-05	GT6S5		TM-15	Line Filter
C27	.05	600		P688-05	GT6S5		TM-15	Line Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	500KΩ	½	RP-504W	Q13-133	AM-60-Z	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions
R2A	1.5 Meg	½ }	RP-155A			Bass control Dual Control
B	1.5 Meg	½ }				Bass control
R3A	1 Meg.	½	RP-105A	Q19-137X	AT-112	Treble control, tapped @ 500KΩ
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R3A per instructions

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	KNIGHT PART No.	IRC PART No.	
R4	10KΩ	½		BTS-10K	Tone Compensation
R5	10 Meg.	½		BTS-10 Meg.	Pre Amp. Grid
R6	220KΩ	½		BTS-220K	Pre Amp. Plate
R7	10 Meg.	½		BTS-10 Meg.	Pre Amp. Grid
R8	120KΩ	½		BTS-120K	Pre Amp. Plate
R9	120KΩ	½		BTS-120K	Pre Amp. Plate
R10	1 Meg.	½		BTS-1 Meg.	Tone Compensation
R11	180KΩ	½		BTS-180K	Tone Compensation
R12	2200Ω	½		BTS-2200	AF Cathode
R13	2200Ω	½		BTS-2200	AF Cathode
R14	1 Meg.	½		BTS-1 Meg.	AF Grid
R15	100KΩ	½		BTS-100K	AF Plate
R16	100KΩ	½		BTS-100K	AF Plate
R17	100KΩ	½		BTS-100K	AF Plate
R18	470KΩ	½		BTS-470K	Tone Compensation
R19	33KΩ	½		BTS-33K	Tone Compensation
R20	33KΩ	½		BTS-33K	Tone Compensation
R21	33KΩ	½		BTS-33K	Tone Compensation
R22	470KΩ	½		BTS-470K	AF Grid
R23	330KΩ	½		BTS-330K	AF Plate
R24	4700Ω	½		BTS-4700	AF Cathode
R25	15Ω	½		BW-½-15	AF Cathode
R26	10KΩ	½		BTS-10K	Phase Inv. Cathode
R27	10KΩ	½		BTS-10K	Phase Inv. Grid
R28	330KΩ	½		BTS-330K	Phase Inv. Plate
R29	330Ω	½		BW-½-330	Feedback
R30	180Ω	½		BW-½-180	Feedback
R31	470KΩ	½		BTS-470K	Output Grid
R32	470KΩ	½		BTS-470K	Output Grid
R33	250Ω	10		AB-250	Output Cathode Wire Wound
R34	47KΩ	½		BTS-47K	Tone Compensation
R35	7500Ω	10		AB-7500	Filter Wire Wound
R36	10KΩ	½		BTS-10K	Filter
R37	10KΩ	½		BTS-10K	Filter
R38	150KΩ	½		BTS-150K	Filter
R39	33KΩ	½		BTS-33K	Filter

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	KNIGHT PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .92A	730VCT .113A DC	5VAC @ 3A	6.3VAC @ 3.2A	LP-0207	P-6014	P-2954	PH-90

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		KNIGHT PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	7.1KΩ CT	4Ω 8Ω 16Ω 250Ω 500Ω	410Ω CT	.35Ω .5Ω .72Ω 17Ω 26Ω	LO-0117	A-3304*	A-3128*		* Drill New Mtg. Holes

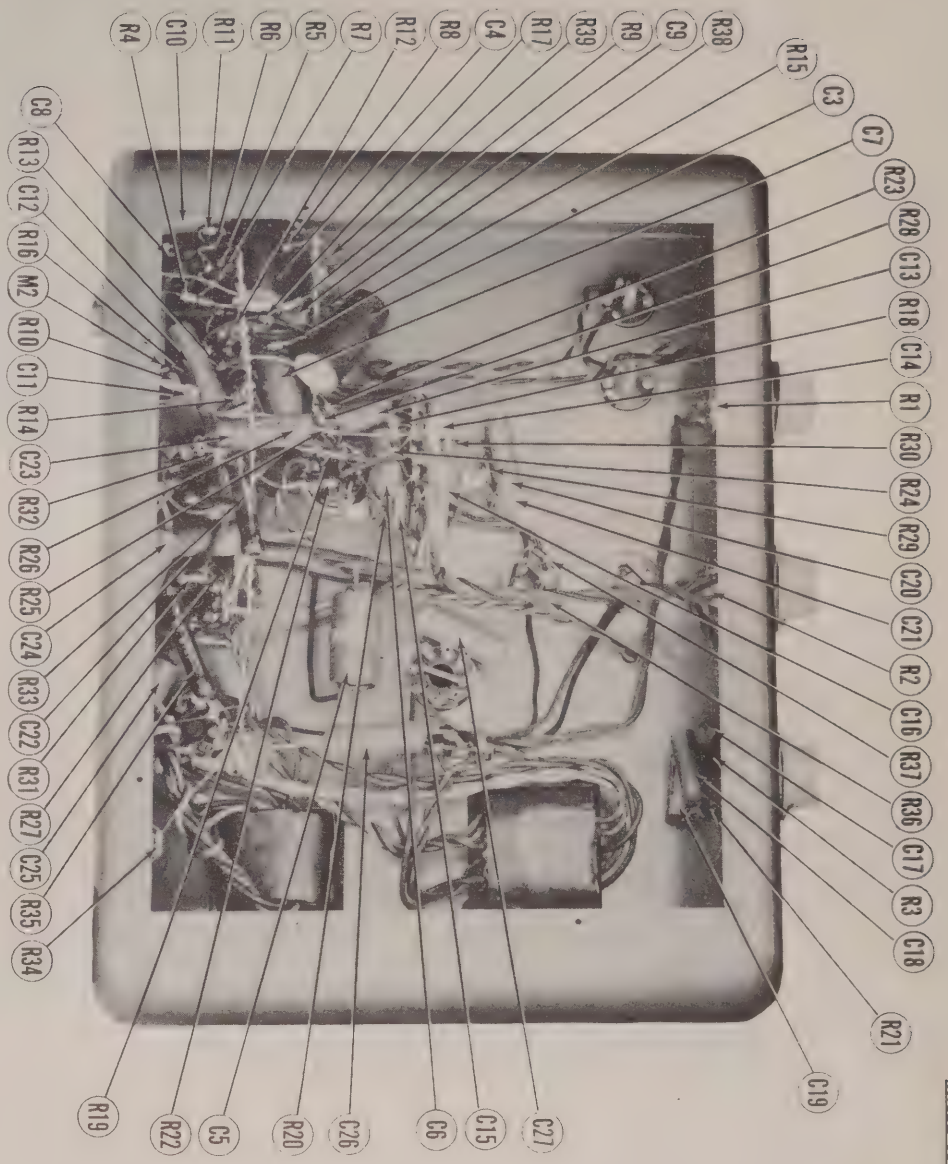
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					KNIGHT PART No.		
M1	Bayonet	6-8	.25	Blue			Type #44

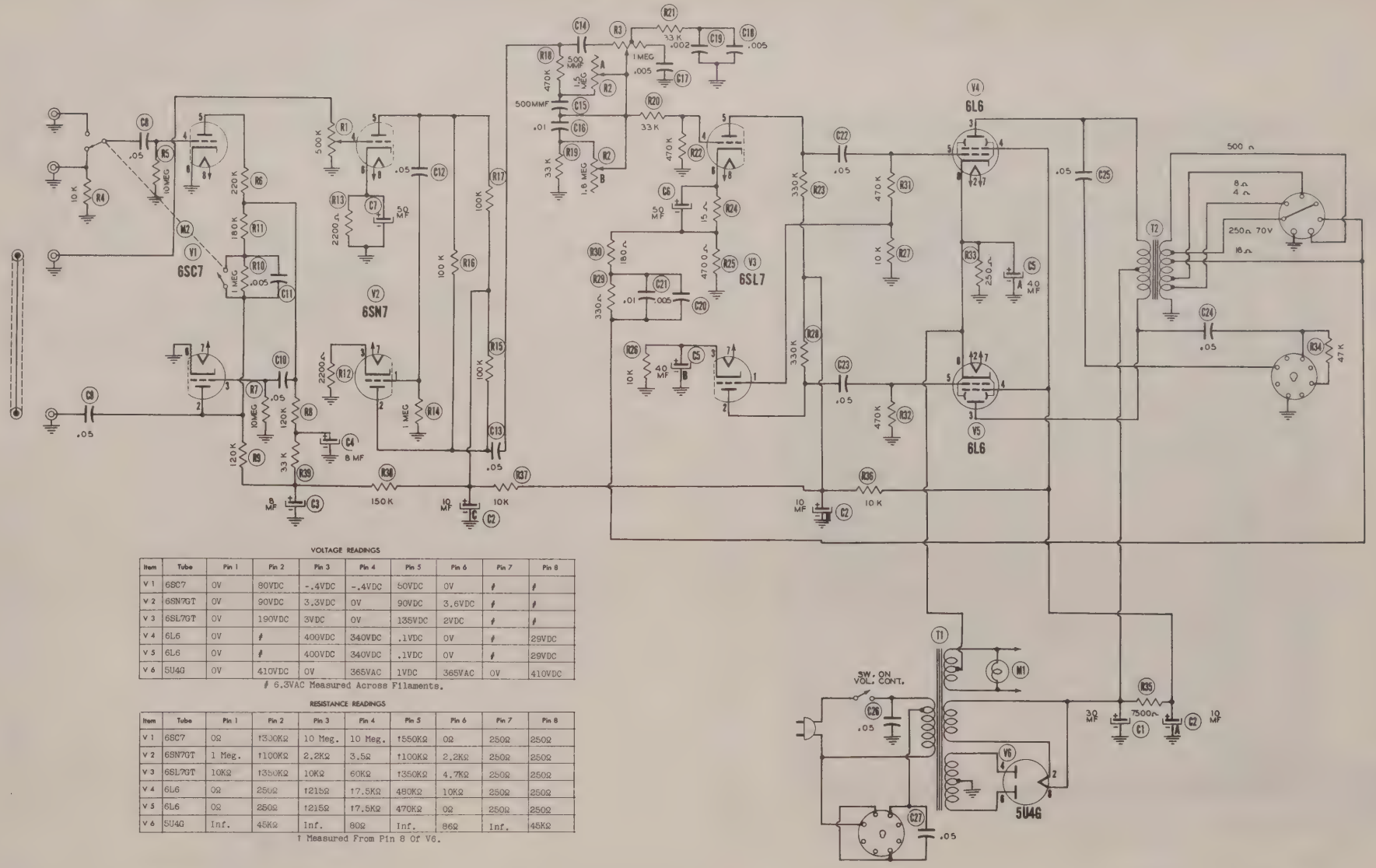
MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M2	Switch		Mike-Magnetic Pickup.

CHASSIS—BOTTOM VIEW



KNIGHT MODEL 92-320



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SC7	0V	80VDC	-.4VDC	-.4VDC	50VDC	0V	#	#
V 2	6SN7GT	0V	90VDC	3.3VDC	0V	90VDC	3.6VDC	#	#
V 3	6SL7GT	0V	190VDC	3VDC	0V	135VDC	2VDC	#	#
V 4	6L6	0V	#	400VDC	340VDC	.1VDC	0V	#	29VDC
V 5	6L6	0V	#	400VDC	340VDC	.1VDC	0V	#	29VDC
V 6	5U4G	0V	410VDC	0V	365VAC	1VDC	365VAC	0V	410VDC

6.3VAC Measured Across Filaments.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SC7	0Ω	†330KΩ	10 Meg.	10 Meg.	†550KΩ	0Ω	250Ω	250Ω
V 2	6SN7GT	1 Meg.	†100KΩ	2.2KΩ	3.5Ω	†100KΩ	2.2KΩ	250Ω	250Ω
V 3	6SL7GT	10KΩ	†350KΩ	10KΩ	60KΩ	†350KΩ	4.7KΩ	250Ω	250Ω
V 4	6L6	0Ω	250Ω	†215Ω	†7.5KΩ	480KΩ	10KΩ	250Ω	250Ω
V 5	6L6	0Ω	250Ω	†215Ω	†7.5KΩ	470KΩ	0Ω	250Ω	250Ω
V 6	5U4G	Inf.	45KΩ	Inf.	80Ω	Inf.	86Ω	Inf.	45KΩ

† Measured From Pin 8 Of V6.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

PACKARD-BELL
MODELS 884, 892

MODEL 884

MODEL 892

PACKARD-BELL
MODELS 884, 892

TRADE NAME	Packard-Bell, Models 884, 892	
MANUFACTURER	Packard-Bell Co., 3443 Wilshire Blvd., Los Angeles, California	
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver with Loop Antenna	
TUBES(EIGHT)	Types 7F8 FM RF-Mixer, 6BE6 FM Osc.-AM Converter, 6BA6 1st IF Amp., 6BA6 FM 2nd IF Amp., 6AL5 Ratio Detector, 6SF7 DET-AVC-AF, 6K6GT Power Output, 5Y3GT Rectifier	
POWER SUPPLY	110-120 Volts AC	RATING: .66 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC	FREQ. MOD. 87.5-108.5MC

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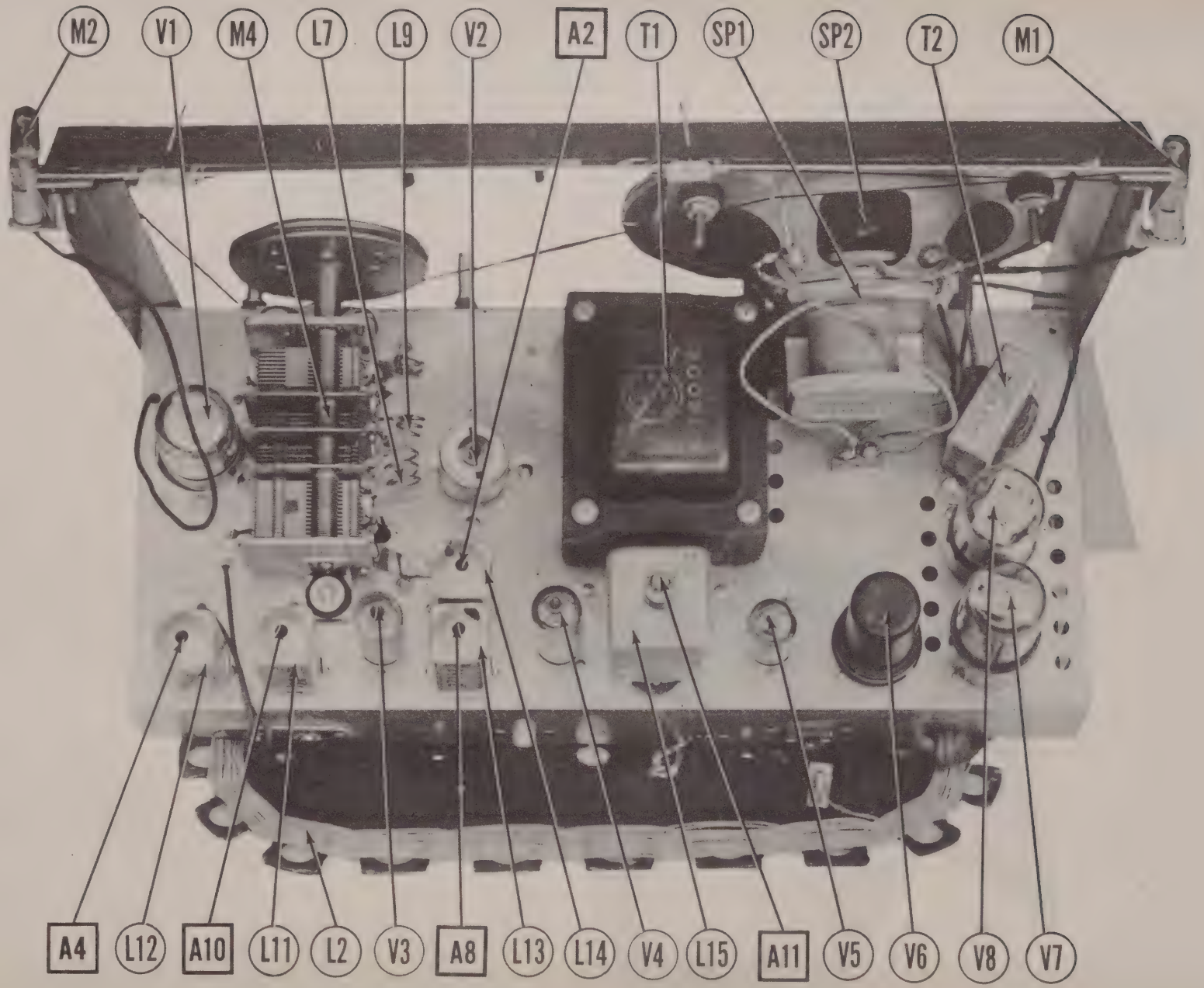
DATE 10/49 SET #74 FOLDER #6


M2
V1
M4
L7
L9
V2
A2
T1
SP1
SP2
T2
M1
A4
L12
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L11
L2
V3
A8
L13
L14
V4
L15
A11
V5
V6
V8
V7

A3
C12
C17
R6
A9
C20
R10
C16
C19
A1
R11
A7
R16
C22
R17
C24
C23
C25
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R12
C6
L6
R4
C7
L5
C8
R3
C5
C9
C10
R5
C18
R9
R14

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PACKARD-BELL PART No.	STANDARD REPLACEMENT		
V1	FM RF-Mixer	7F8	7F8	8BW	
V2	AM Converter -FM Osc.	6BE6	6BE6	7CH	
V3	1st IF Amp.	6BA6	6BA6	7BK	
V4	FM 2nd IF Amp.	6BA6	6BA6	7BK	
V5	Ratio Det.	6AL5	6AL5	6BT	
V6	AM Det.-AVC-AF	6SF7	6SF7	7AZ	
V7	Power Output	6K6GT	6K6GT	7S	
V8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PACKARD-BELL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1	40	450	24030	PRS450/40	BR4045		UT-40	Filter
C2	40	350	24004-1	PRS450/40	BR4045		UT-40	Filter
C3	25	25	24006	PRS25/25	BR252A		TVA-6	Output Cath. Bypass
C4	5	50	24038	PRS150/4	BR550		TVA-13	Stabilizing Cap.
C5	470		23916	1468-0005	5W5T5	GP2K-470	1FM-35	RF Cath. Bypass
C6	470		23916	1468-0005	5W5T5	GP2K-470	1FM-35	RF Plate Decoupling
C7	100		23914	1468-0001	5W5T1	GP1K-100	1FM-31	RF Coupling
C8	100		23914	1468-0001	5W5T1	GP1K-100	1FM-31	RF Coupling
C9	470		23916	1468-0005	5W5T5	GP2K-470	1FM-35	FM Conv. Fil. Bypass
C10	100		23941	1469-0001	5R5T1	NP0M-100	MS-31	Fixed Trimmer
C11	470		23916	1468-0005	5W5T5	GP2K-470	1FM-35	AM Conv. Fil. Bypass
C12	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	AVC Filter
C13	33		23940	1468-0004	5W5Q4	GP1K-33	1FM-44	Osc. Grid Cap
C14	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	Osc. Anode Bypass
C15	100		23914	1469-0001	5R5T1	NP0M-100	MS-41	Fixed Trimmer
C16	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	Conv. Plate Decoupling
C17	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	AVC Filter
C18	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	RF Bypass
C19	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	1st IF Screen Bypass
C20	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	1st IF Plate Dec.
C21A	100		*	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
B	100		*	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C22	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	2nd IF Grid Filter
C23	470		23916	1468-0005	5W5T5	GP2K-470	1FM-35	2nd IF Fil. Bypass
C24	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	2nd IF Screen Bypass
C25	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	2nd IF Plate Dec.
C26	150		23942	1468-00015	5W5T15	GP2K-150	1FM-315	Diode Load Cap Note 1
C27	150		23942	1468-00015	5W5T15	GP2K-150	1FM-315	Diode Load Cap Note 1
C28	.002	600	23002	P688-002	GT6D2	GP2M-002	TM-22	De-emphasis
C29	470		23916	1468-0005	5W5T5	GP2K-470	1FM-35	Ratio Det. Fil. Bypass
C30	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C31	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C32	.002	600	23002	P688-002	GT6D2	GP2M-002	TM-22	Tone Compensation
C33	.05	400	23009	P488-05	GT4S5		TM-15	AF Screen Bypass
C34	100		23914	1468-0001	5W5T1	GP1K-100	1FM-31	AF Plate Bypass
C35	.005	600	23004	P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C36	.01	500	23023-1	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C37	.1	400	23011	P488-1	GT4P1		TM-1	AF Plate Dec.
C38	.005	600	23004	P688-005	GT6D5		TM-25	Output Plate Bypass
C39	.01	125AC	23932	P688-01	GT6S1		TM-11	Line Filter

* Item C21A, C21B, And R13 Are Combined Into One Unit.
Note 1. When Either Item C26 Or C27 Are Replaced, Replace Both With Capacitors Of Equal Value.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PACKARD-BELL PART No.	IRC PART No.	CLAROSTAT PART No.	
R1A	1 Meg.	½	25010	Q13-137X	T-109	Volume control, tapped @ 200KΩ
B	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions
R2	3 Meg.	½	25503	Q13-140	M-67-Z	Tone control

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PACKARD-BELL PART No.	MEISSNER PART No.	
L1	FM Dipole	.0Ω		29326		
L2	AM Loop Ant	.2Ω	1.2Ω	29325		
L3	Parasitic Sup.	0Ω		73005		3 Turns Of Wire On 22Ω Resistor
L4	Parasitic Sup.	0Ω		73005		3 Turns Of Wire On 22Ω Resistor
L5	FM Ant. Loading	0Ω		73126		
L6	RF Choke	.1Ω		29104		9 Turns Of Wire On 1500Ω Resistor
L7	FM RF Coil	0Ω		29111		
L8	RF Choke	.1Ω		29104		
L9	FM Osc.Coil	0Ω		29214		
L10	AM Osc.Coil	8.3Ω		29202	14-1060	
L11	1st FM IF	.5Ω	1Ω	29032		
L12	1st AM IF	19Ω	20Ω	29033	16-6678	
L13	2nd FM IF	1.5Ω	.5Ω	29022A		
L14	2nd AM IF	20Ω	19Ω	29034	16-6678	
L15	Ratio Det. Trans	2Ω	.1Ω	29037		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					PACKARD-BELL PART No.		
M1	Bayonet	6-8	.25	Blue	54001		Type #44
M2	Bayonet	6-8	.25	Blue	54001		Type #44

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	PACKARD-BELL PART No.	ASTATIC PART No.	
M3	63026	LT3-M	

MISCELLANEOUS

ITEM No.	PART NAME	PACKARD-BELL PART No.	NOTES
M4	Switch	86022A	Band-Phono
M5	2 Gang Var. Cap.	23526A	(18-472MMF, 31-207MMF)
	Dial	38104	Stationized (Model 884)
	Dial	38105	Stationized (Model 892)
	Dial Pointer	67033	Model 884
	Dial Pointer	67015	Model 892
	Cabinet	21073	Model 884
	Cabinet	21077	Model 892
	Knob	52008-AS	Dark Brown (Model 884)
	Knob	52008-BY	Oak (Model 884)
	Knob	52008-AL	Ivory (Model 892)
	Knob	52008-BM	Light Mahogany (Model 892)

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PACKARD-BELL PART No.	IRC PART No.	
R3	22KΩ	½	73041	BTS-22K	FM Conv. Cathode
R4	1000Ω	½	73025	BTS-1000	FM Conv. Decoupling
R5	470KΩ	½	73051	BTS-470K	FM Osc. Grid
R6	1000Ω	½	73025	BTS-1000	AM Conv. Plate Decoupling
R7	4700Ω	1	73075	BTS-4700	AM Osc. Anode
R8	22KΩ	½	73041	BTS-22K	AM Osc. Grid
R9	100KΩ	½	73047	BTS-100K	AVC Network
R10	68Ω	½	73011	BW-½-68	1st IF Cathode
R11	22KΩ	½	73041	BTS-22K	1st IF Screen
R12	1000Ω	½	73025	BTS-1000	1st IF Plate Decoupling
R13	47KΩ	½	*	BTS-47K	Diode Filter
R14	1 Meg.	½	73073	BTS-1 Meg.	AVC Network
R15	270KΩ	½	73049-3	BTS-270K	Diode Load
R16	470KΩ	½	73051	BTS-470K	2nd FM IF Grid
R17	120Ω	1	73080	BW-1-120	2nd FM IF Cathode
R18	68KΩ	½	73046	BTS-68K	2nd FM IF Screen
R19	1000Ω	½	73025	BTS-1000	2nd FM IF Plate Decoupling
R20	220Ω	½	73017	BW-½-220	Balancing
R21	6800Ω	½	73035	BTS-6800	Ratio Det. Diode Load
R22	6800Ω	½	73035	BTS-6800	Ratio Det. Diode Load
R23	27KΩ	½	73042	BTS-27K	De-emphasis
R24	47KΩ	½	73045	BTS-47K	Tone Compensation
R25	4.7 Meg.	½	73057	BTS-4.7 Meg	AF Grid
R26	270KΩ	½	73049-3	BTS-270K	AF Plate
R27	100KΩ	½	73047	BTS-100K	AF Plate Decoupling
R28	1.5 Meg	½	73054	BTS-1.5 Meg	AF Screen
R29	470KΩ	½	73051	BTS-470K	Output Grid
R30	470Ω	1	73078	BTA-470K	Output Cathode
R31	2700Ω	2	73128	BT-2-2700	Output Plate See Note 1
R32	2500Ω	10	73917	AB-2500	Filter Wire Wound See Note 2

* Items C21A, C21B And R13 Are Combined Into One Unit.
Note 1. Not Used In Model 892.
Note 2. Model 892 Uses 1500Ω, 5W Resistor In This Application.

TRANSFORMER (POWER)

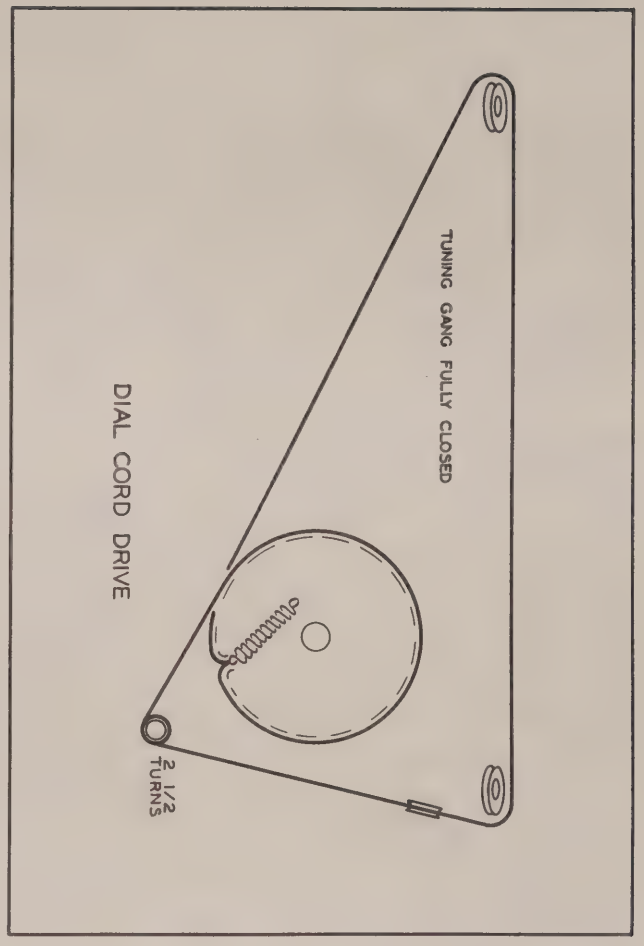
ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	PACKARD-BELL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .66A	680VCT .078A DC	5VAC @ 2A	6.3VAC @ 2.6A	89006	P-6012	P-2952	PH-70B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PACKARD-BELL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	9KΩ	3.5Ω	700Ω	.6Ω	89402	A-3879	A-2932	RO-16	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	V.C. IMP.	PACKARD-BELL PART No.	JENSEN PART No.	QUAM PART No.	
SP1A	PM	3.5Ω	83302	ST-110	6A21	Used In Model 884
B	PM		83705	MODEL P6-V		Used In Model 892
	CONE DIA.	V.C. DIA.				
SP2A	6 1/4"	9/16"				
B	10"					



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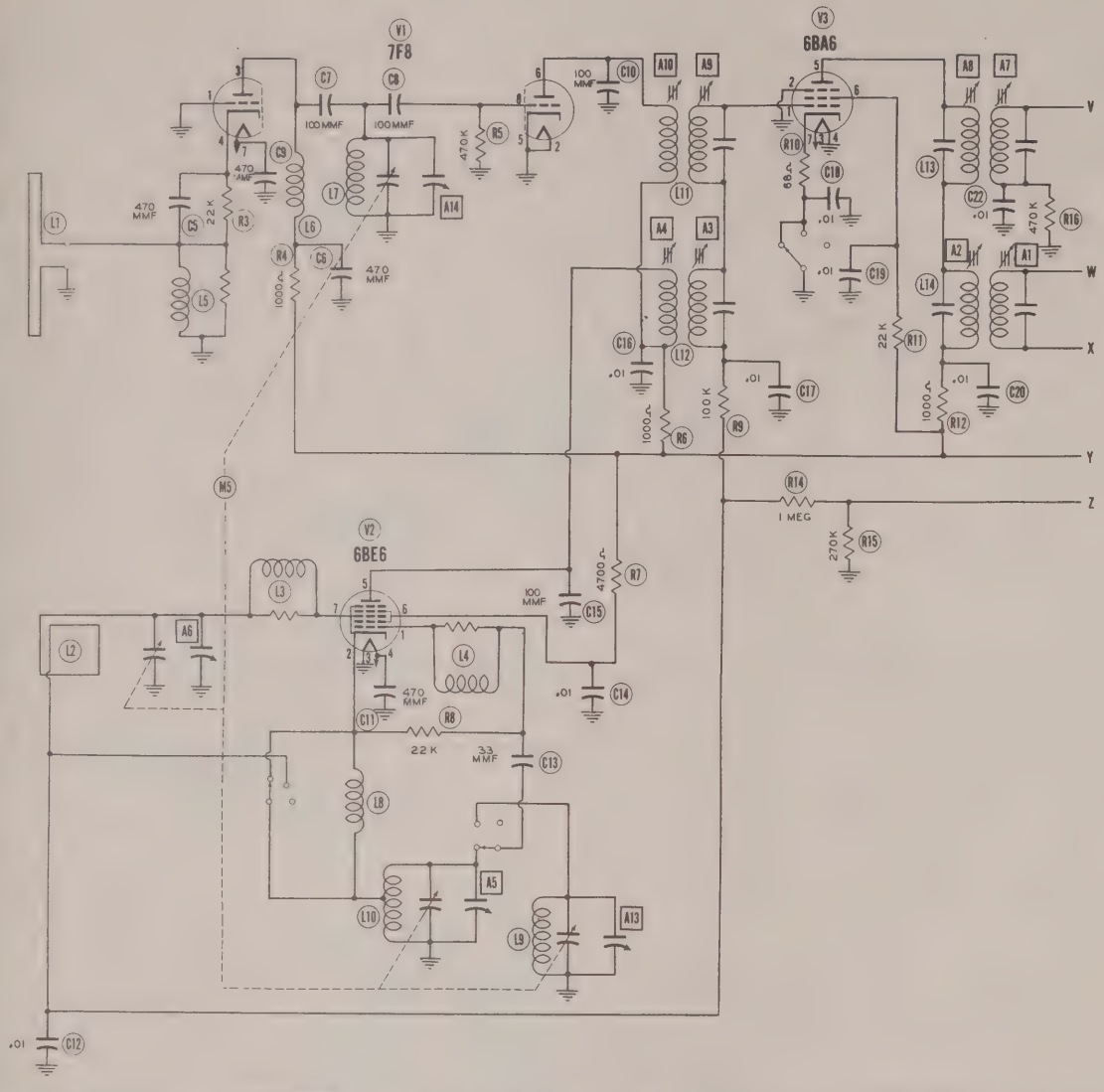

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡V1	7F8	0V	0V	220VDC	6VDC	0V	210VDC	6.3VAC	-.5VDC
V2A	6BE6	$-20VDC	0V	0V	6.3VAC	190VDC	130VDC	.2VAC	
‡V2B	6BE6	$-.2VDC	0V	0V	6.3VAC	210VDC	145VDC	0V	
V3	6BA6	.3VDC	0V	0V	6.3VAC	190VDC	100VDC	1.2VDC	
‡V4	6AL5	0V	0V	0V	6.3VAC	210VDC	60VDC	1VDC	
‡V5	6AL5	-.4VDC	-.4VDC	0V	6.3VAC	0V	0V	-.7VDC	
V6	6SF7	0V	0V	-.6VDC	0V	-.3VDC	13.5VDC	6.3VAC	0V
V7	6K8GT	0V	0V	270VDC	210VDC	0V	160VDC	6.3VAC	13VDC
V8	6Y3GT	0V	0V	350VDC	0V	330VAC	0V	330VAC	280VDC	350VDC

$ Taken With Vacuum Tube Voltmeter
‡ Taken In FM Position.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡V1	7F8	0Ω	0Ω	†3.5KΩ	22KΩ	0Ω	†.7KΩ	.1Ω	†7KΩ
V2A	6BE6	22KΩ	1Ω	0Ω	.1Ω	†3.5KΩ	†7KΩ	1.2 Meg	
V2B	6BE6	22KΩ	1Ω	0Ω	.1Ω	†3.5KΩ	†7KΩ	1Ω	
V3	6BA6	1.4 Meg	0Ω	0Ω	.1Ω	†3.5KΩ	†25KΩ	0Ω	
‡V4	6BA6	470KΩ	0Ω	0Ω	.1Ω	†3.5KΩ	†70KΩ	120Ω	
‡V5	6AL5	Inf.	Inf.	0Ω	.1Ω	0Ω	0Ω	13KΩ	
V6	6SF7	0Ω	4.7 Meg	0Ω	†1.5Meg	300KΩ	†370KΩ	.1Ω	0Ω
V7	6K8GT	0Ω	0Ω	†3KΩ	†2.5KΩ	47KΩ	†100KΩ	.1Ω	470Ω
V8	6Y3GT	Inf.	50KΩ	Inf.	120Ω	Inf.	130Ω	50KΩ	50KΩ

† Measured From Pin 8 Of V8.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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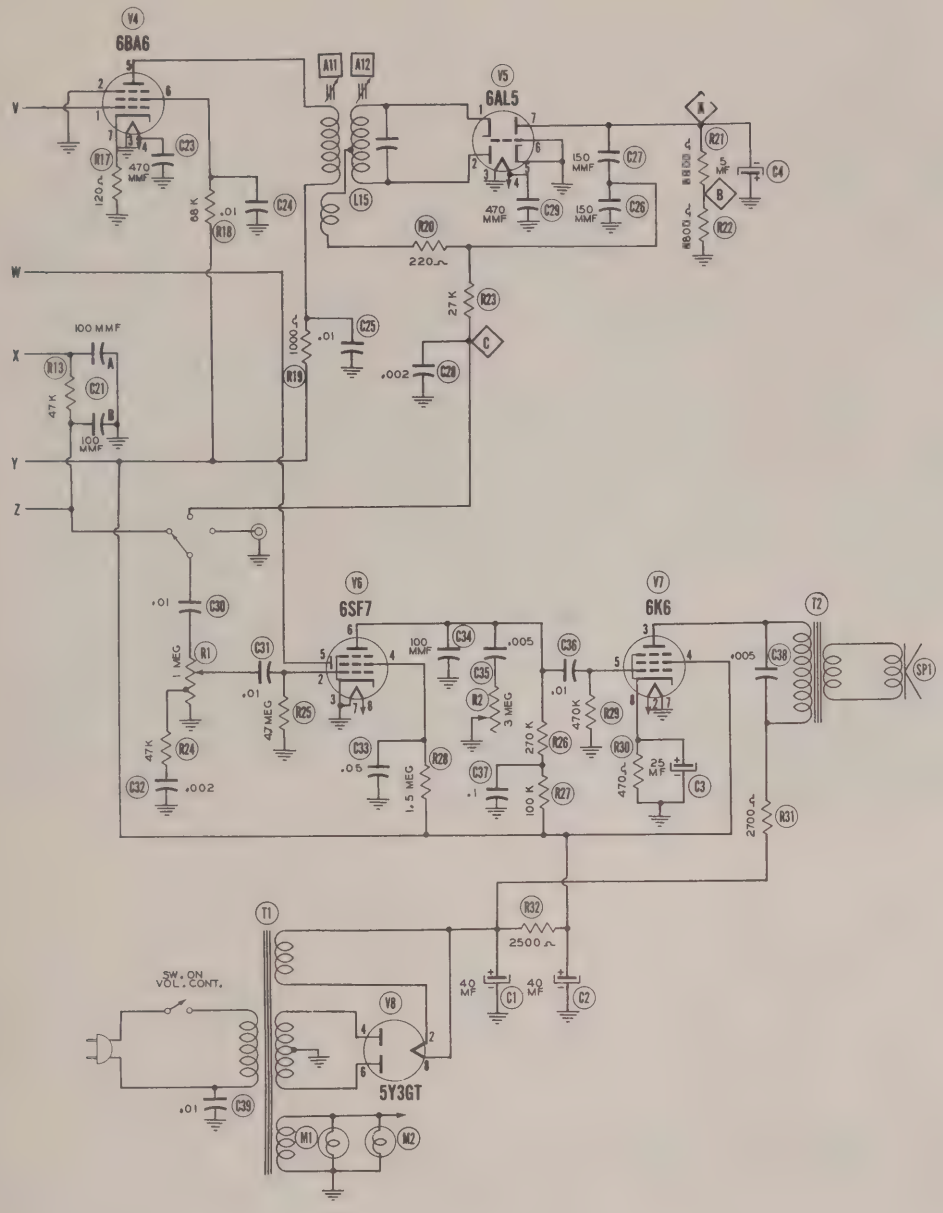

IF=455 KC AM

IF=10.7 MC FM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

When complete alignment is to be performed, it is recommended that it be done in the order given below.

In the event of replacement of an AM IF transformer, or any other AM IF component, the FM IF alignment should be rechecked.

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

The loop used in steps 2 and 3 should be a Hazeltine Standard Loop No. 1150 or a reasonable substitute.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis.	455KC (400∿ Mod.)	AM (extreme counter clock-wise)	Tuning gang fully closed	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2.		Loop (Radiated see note above)	1620KC (400∿ Mod.)	"	Tuning gang fully open	"	A5	"
3.		Loop (Radiated see note above)	1500KC (400∿ Mod.)	"	Tune for maximum output	"	A6	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 8 (Grid) of 7F8 (V1). Low side to chassis.	10.7MC (Unmod.)	FM (center pos.)	Tuning gang fully closed	DC Probe to Point (A) Common to Point (B)	A7,A8, A9,A10	Adjust for maximum deflection.
5.	.01MFD	"	"	"	"	"	A11	"
6.	.01MFD	"	"	"	"	DC Probe to Point (C) Common to Point (B)	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 5 and 6.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6BA6 (V3). Low side to chassis.	10.7MC (450KC Sweep)	FM (center pos.)	Point of non interference	Vert.Amp. to Point (A) Low side to chassis.	A7,A8, A11	Disconnect stabilizer capacitor C9. Adjust A7, A8 and A11 for maximum amplitude and symmetry as per Fig 1.
5.	.01MFD	High side to pin 8 (Grid) of 7F8 (V1). Low side to chassis.	"	"	"	"	A9,A10	Adjust for maximum amplitude and symmetry as per Fig 1.
6.	.01MFD	"	"	"	"	Vert.Amp. to Point (C) Low side to chassis.	A11, A12	Reconnect stabilizer capacitor C9. Adjust A12 so crossover occurs at center of pattern as per Fig 2. Slightly retouch A11 for maximum amplitude and straightness of cross over lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	300Ω carbon res.	High side thru 300Ω to ungrounded FM antenna terminal. Low side to chassis.	108MC (Unmod.)	FM	108MC	DC Probe to Point (A) Common to Point (B)	A13	Adjust for maximum deflection.
8.	"	"	"	"	"	"	A14	Adjust for maximum deflection. For best results repeat steps 7 and 8 several times.

FIG. 1

FIG. 2

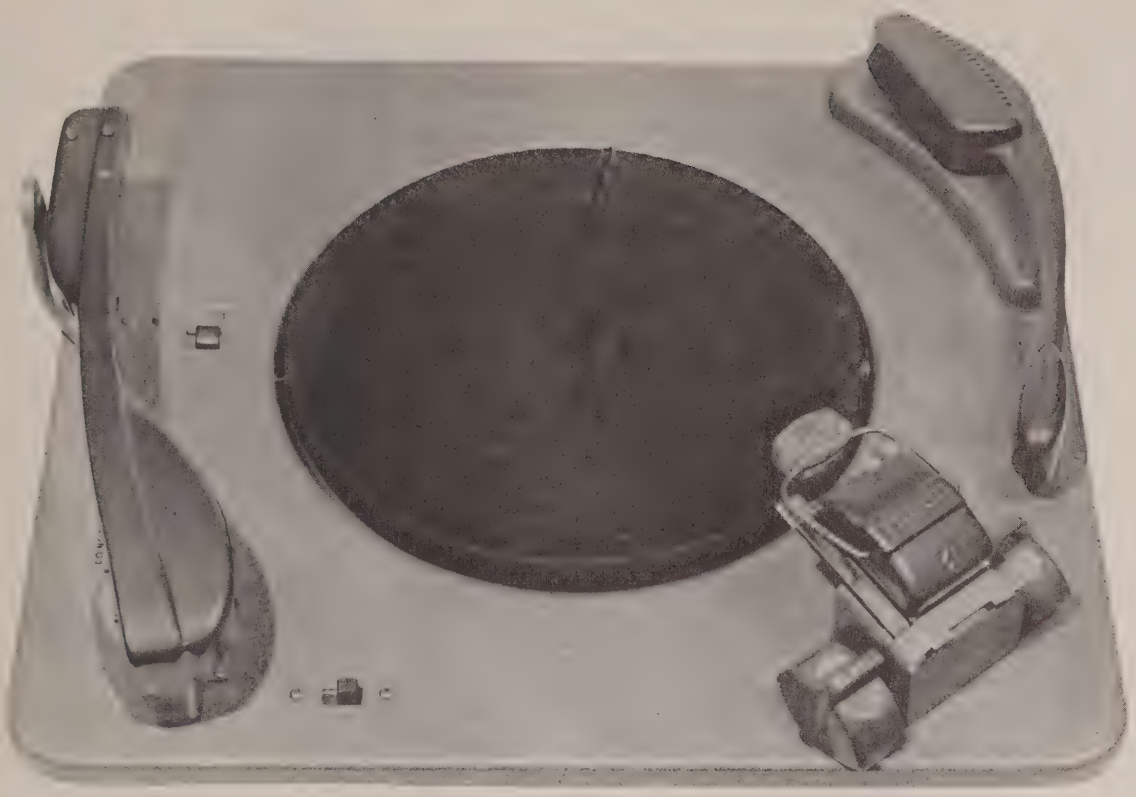

FIGURE 1

GENERAL INFORMATION

The Philco Model M-9C is an automatic record changer and record player. One arm is used in conjunction with the automatic record changer mechanism, which is designed to play up to ten 12-inch records or twelve 10-inch records at a single loading, at the standard speed of 78 R.P.M. The changer will continue to play the last record until the mechanism is turned off. The other tone arm is used, manually, to play the new long-play records at a speed of 33⅓ R.P.M. Upon completion of the record, the mechanism shuts off automatically by the tripping of the mercury switch. Upon returning the tone arm to its rest position, the mercury switch is reset to its "on" position, thereby returning power to the motor, which then must be turned off by the motor switch.

A safety feature is employed in the pickup mechanism to prevent damage to the mechanism if, at any time, the arm is held during the change cycle.

Non-standard and home recordings should be played in the "Manual" position, using the automatic record changer tone arm.

The changer operates on 117 volts AC at 60 cycles.

Manufactured by: **PHILCO RADIO AND TELEVISION CORPORATION**
Philadelphia, Pennsylvania

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PHILCO
MODEL M-9C

PHILCO
MODEL M-9C

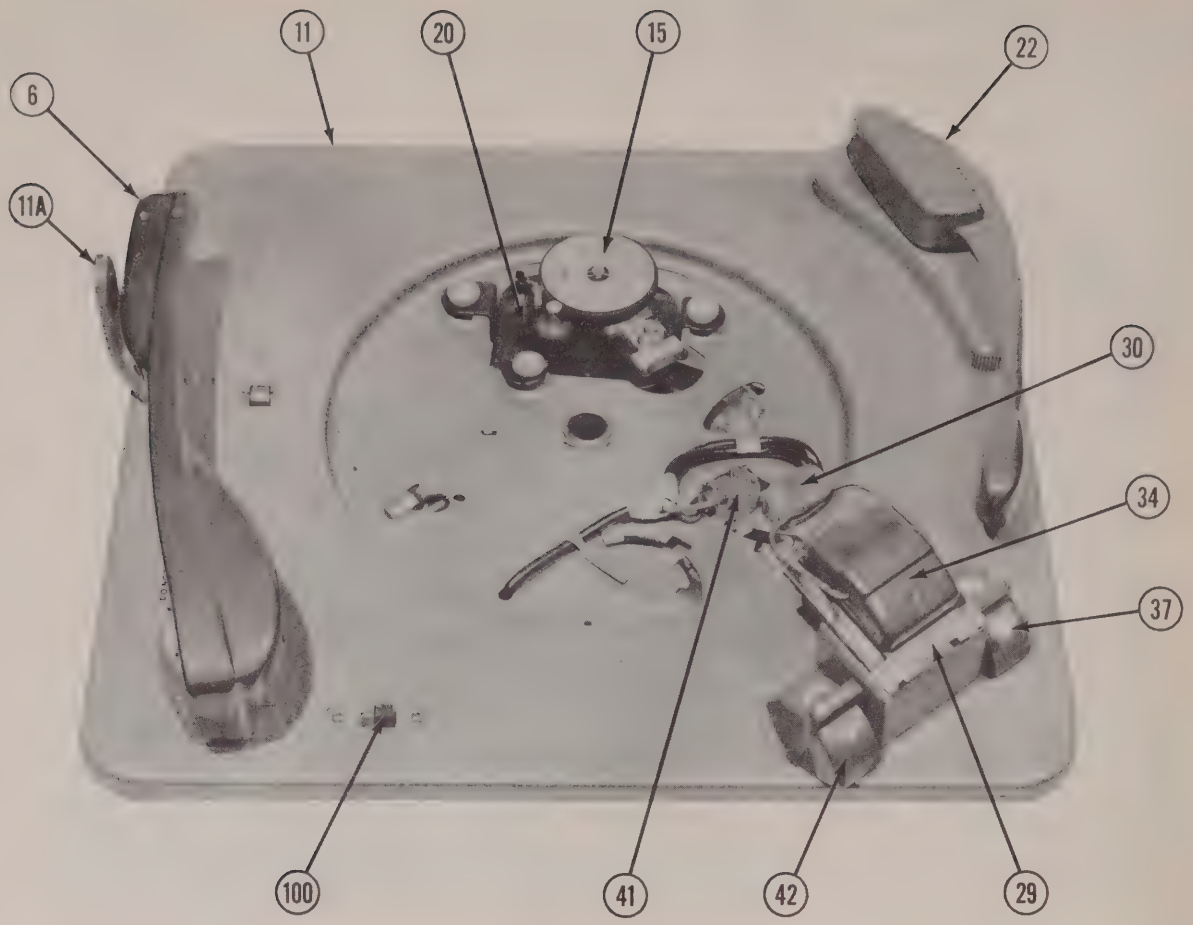

FIGURE 2—TOP VIEW LESS TURNTABLE

OPERATING PROCEDURE

Long-Play Tone Arm

The following procedure is necessary to have definite and satisfactory results in the operation of the long-play arm (22):

1. Be sure the automatic record changer tone arm (6) is hooked on to its rest (11A).
2. Set the Rej.-Auto.-Man. Control (42) to the "Man." position. *This is not absolutely necessary but enervates the mechanism of any automatic operation.*
3. Set the Standard-Play, Long-Play control (37) to the "Long-Play" position.

This operation actuates the selector link (62) and selector lever (58), which, in turn, pivots the shift lever of the motor assembly (20) in toward the idler wheel (15). This causes the large pulley of the motor (which is driven by the motor shaft through a belt) to engage and drive the idler wheel (15), which, in turn, drives the turntable at the slow speed of 33⅓ R.P.M.

The selector lever (58) also operates the double-pole, single-throw switch (41), which cuts out the output of the record changer tone arm (6) and closes the circuit for the record player tone arm (22).

4. Turn the record shelf and cover assembly (34) to the 12" position. This is to allow clearance for placing records on the turntable.
5. Place a long-play record on the turntable.
6. Move the motor switch to the "on" position.
7. Place the long-play tone arm (22) on the starting groove of the record.
8. Upon completion of the record, the mechanism shuts off automatically. This is due to the oscillation of the tone arm in the eccentric finish groove of the record, which is transmitted to the reset trip arm (47) through the pivot assembly (27). This action causes the trip finger of the trip arm to actuate the ratchet latch plate (52B), thereby allowing the bracket clip assembly (52C) to drop and tip the mercury switch to the "off" position. This opens the motor circuit and stops the turntable.

When the tone arm (22) is moved back to its rest post, the leg on the reset trip arm (47) contacts an ear of the bracket clip assembly (52C), which tips the mercury switch to the "on" position. The motor circuit is now controlled only by the "on-off" switch (100).

9. Remove the record from the turntable.

CAUTION: Do not store records on the turntable. This may cause the records to warp and cause "Wow" when they are being played.

Automatic Operation

1. Turn the record shelf to the 10-inch or 12-inch position corresponding to the size of records to be played.
2. Move the Standard-Play, Long-Play Control (37) to Standard-Play position. This action causes the larger pulley of the motor to be retracted, allowing the motor shaft to engage the idler wheel (15) to provide the turntable speed of 78 R.P.M.
3. Move the rubber bumper back out of the way.
4. Place as many as ten 12-inch records or twelve 10-inch records on the spindle not intermixed, allowing them to rest on the record shelf.
5. Place the rubber bumper (30) or "Record Weight" on the top record. This is to hold the records in contact with the record shelf.
6. Turn the motor switch (100) to the "on" position.
7. Push the Rej.-Aut.-Man. Control (42) to the "Rej." position and release. The changer will now play the entire stack of records and will repeat the last record until the switch (100) is turned to the "off" position.

Manual Operation

All odd-size, warped, and home recordings should be played manually:

1. Be sure the Standard-Play and Long-Play control (37) is in the Standard-Play position.
2. Turn the record shelf and cover assembly (34) to the 12" position. This is to provide clearance for placing records on the turntable.
3. Move the Rej.-Aut.-Man. Control (42) to the "Man." position.
4. Place a record on the turntable.

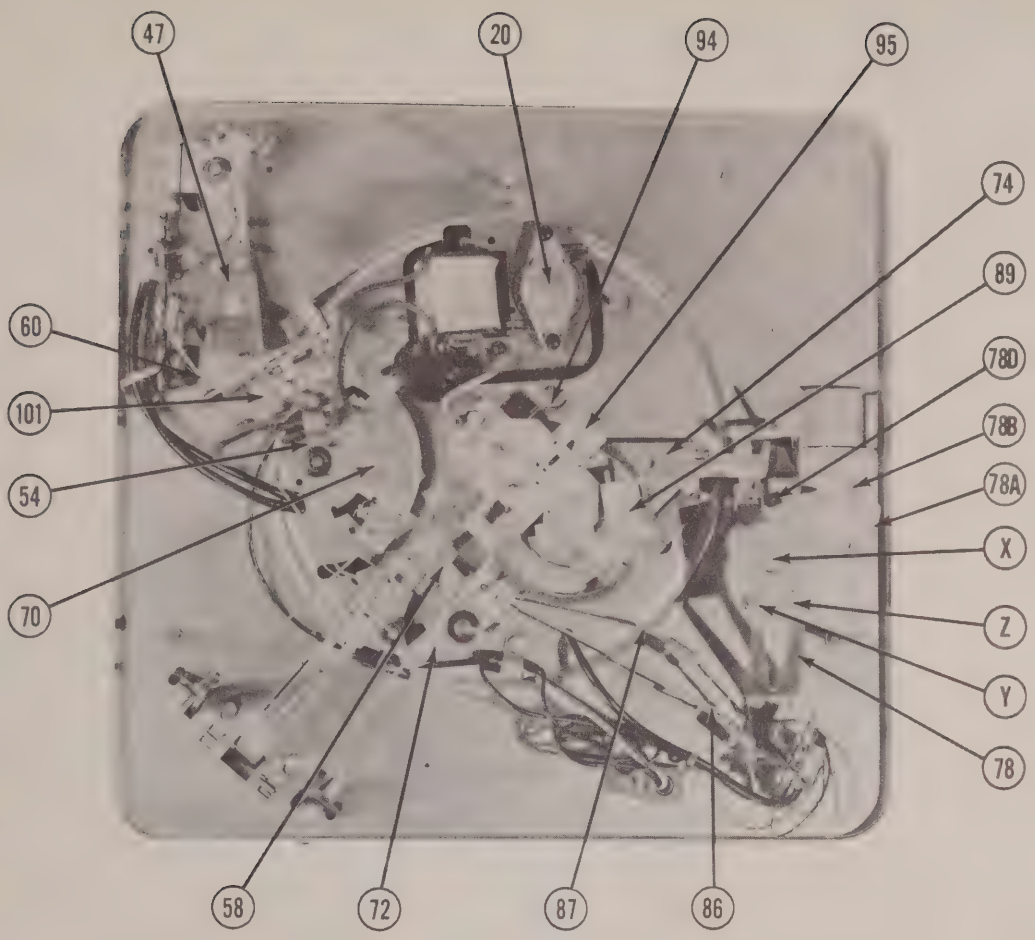

FIGURE 3—BOTTOM VIEW

5. Turn the motor switch (100) on.
6. Place the record changer tone arm (6) on the record.
7. On completion of the record, place the tone arm on its rest (11A), turn the switch (100) to "off" position and remove the record.

CHANGE CYCLE

As the tone arm (6) rides into the eccentric groove of the record, its oscillation causes the trip finger of the trip receiver (78A) to push against the screw of the trip plate assembly (89). This action moves the trip receiver from in front of the finger of the retractable segment on the bottom of the cam gear (88), allowing the segment to mesh with the turntable hub gear which is in constant rotation. This starts the change cycle.

As the cam gear rotates, cam surface (88A) actuates the lift actuator lever (72), which, in turn, pulls the short link (87), link spring (82) and pull-cord assembly (10), thus raising the pickup arm off the record. The pull cord (23), spring, and link assembly (60) attached to the long-play arm (22), are also connected to the lift actuator lever (72). This permits the long-play tone arm (22) to be lifted and set on its rest post if the record changer is put into a change cycle. Cam surface (88B) contacts and moves the pickup arm swing lever (71). This lever, through the linkage of the long link (86), spring (85) and the trip arm (78), which is fastened to the shaft and swivel (12), swings the pickup arm (6) out against the rubber grommet of the arm rest (11A).

Cam roller (88C) of the cam gear (88) moves against the push-off actuator (70), which, in turn, operates the push-off mechanism, thus selecting and dropping a record to the turntable.

At approximately the same time the push-off mechanism is actuated, the selector hinge (74) is actuated by the cam gear (88), causing the feeler (75) to be raised above the baseplate. The movement of the feeler carries the 12-inch selector with it.

The swing lever (71) now moves the tone arm in for set down. For 10" positioning, the trip arm stop (78B) moves against the finger of the selector hinge (74). This positions the pickup arm (6) for 10" position. With the presence of a 12" record on the turntable, the feeler (75) is depressed by the weight of the record. This pivots the 12" selector (76) in the path of the trip arm stop (78B), thereby upon contact, positioning the tone arm for 12" set down.

The tone arm lift lever (72) now lowers the tone arm to the starting groove of the record.

Finger (A) of the selector hinge (74) rides off the top cam surface of the cam gear (88). This allows the selector mechanism to be pivoted from in front of the trip arm stop, giving the tone arm free movement to track across the record.

The retractable segment of the cam gear now engages the trip plate (89), which pulls the segment away from any contact with the turntable hub. The cam is now held in a neutral position by the engagement of the cam roller (88C) and the index lever (79). This completes the change cycle.

Reject Operation

When the control button (42) is pushed in the direction of "Rej.," the slide control bar (95) is pulled against the trip plate (89) by the control link (96). This trips the mechanism and starts the change cycle; therefore, a record may be rejected any time, while playing, by moving this control.

Operation of the "Man." Control

When the control button (42) is moved to the "Man." position, the slide control bar (95) is moved against a flange of the retractable segment of the cam gear (88), thereby preventing the retractable segment from engaging the turntable hub gear.

The "U" springs (97) return the reject mechanism to its normal position when the control button is moved to the "Rej." position. They also snap and hold the slide control bar (95) when it is in the manual position.

ADJUSTMENTS

Tone Arm Positioning

1. Remove the power plug.

A PHOTOFACT "EXPLODED" VIEW

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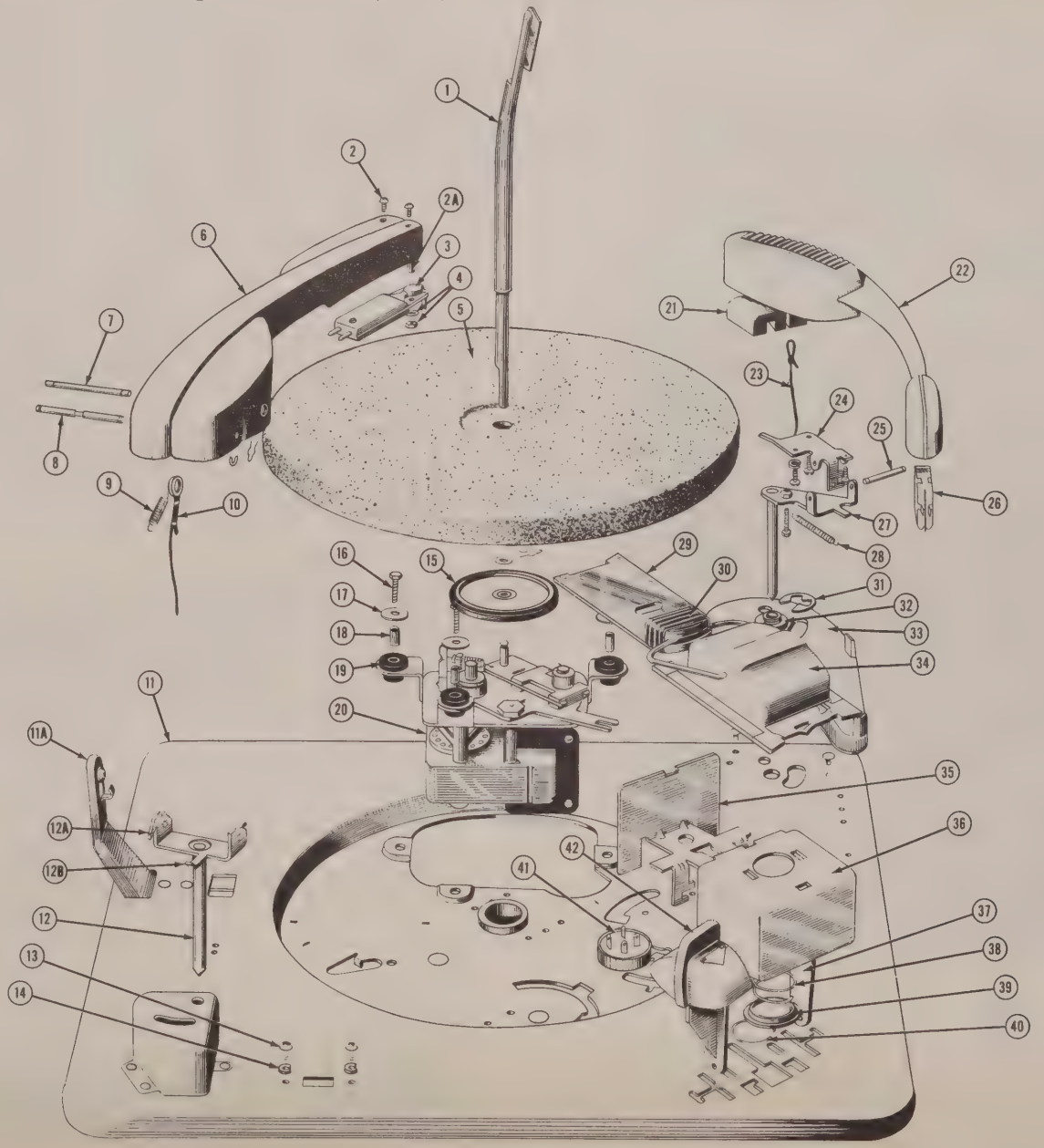

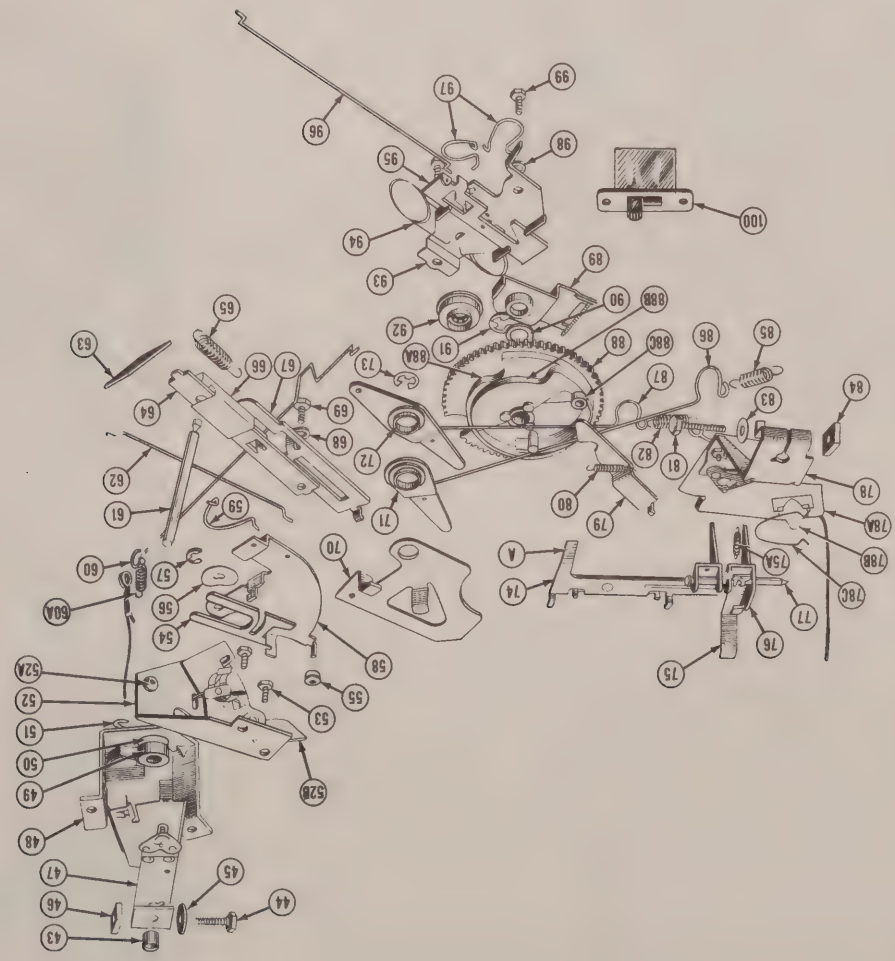
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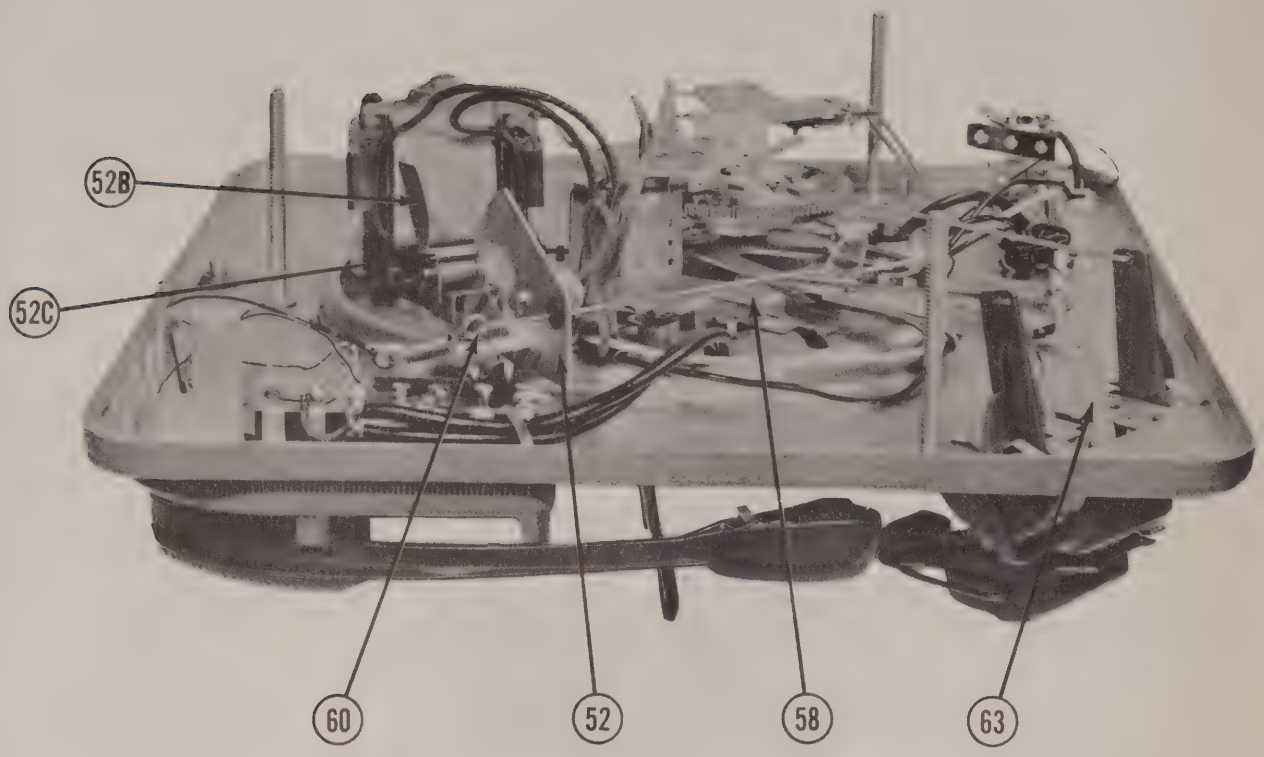

FIGURE 4—SIDE VIEW

2. Place a 10-inch record on the turntable.
3. Push the control button (42) to "Rej." and release.
4. Rotate the turntable clockwise until the tone arm moves in over the record and drops to approximately ½" above the turntable.
5. Loosen the clamp screw (81) on the trip arm (78).
6. Hold the tone arm ⅛" in from the edge of the record.
7. Set the trip arm (78) so the trip arm stop (78B) is in contact with the selector hinge finger (74).
8. Tighten the clamp screw (81) leaving a vertical clearance between the trip arm and base plate of 1/32".

This adjustment should be satisfactory for 12" set down; however, if the 12" set down is off, the adjustment can be made by slightly bending the 12" selector (76) to the right or left, depending on the direction the tone arm is to be moved.

Tone Arm Height

With the changer out of cycle, place the tone arm next to the turntable. The needle point should clear the base plate by at least 1/16" and should not be any higher than the top of the turntable. To make the proper adjustment, bend the top ear (12A) of the tone arm swivel (12). Bending the ear down raises the tone arm.

The correct height of the tone arm during the change cycle is when the lower edge of the tone arm clears the top of the protruding hook on the rest post by not less than ⅛" and not more than ¼". Adjust by bending the lower ear (12B) of the tone arm swivel.

Pickup Arm Vertical and Horizontal Timing

Before making these adjustments, make the tone arm height and lift adjustments.

1. For Vertical Adjustment:
   (a) Remove the power plug.
   (b) Push the control button (42) to the "Rej." position and release.
   (c) Rotate the turntable, by hand, in a clockwise direction, ¾ of a revolution. At this point, the leading edge of the cam surface (88A) is approximately ¼" from the end of the lift actuator lever (72).
   (d) Adjust the wire loop (87), by squeezing or opening the loop until the tone arm lift pin (8) makes contact with the lower ear (12B) of the tone arm swivel (12).
2. For Horizontal Adjustment:
   (a) Rotate the turntable another ¾ revolution from the point at which the vertical adjustment was made. At this point, the leading edge of the cam surface (88B) is approximately ¼" from the end of the tone arm actuator lever (71).
   (b) Adjust the wire loop of the long link (86) and spring assembly, attached to the trip arm (78), by squeezing or opening the loop until the tone arm makes contact with the rubber bumper on the tone arm post (11A).

Trip Finger and Trip Receiver Adjustment

1. Place a record on the turntable.
2. Place the tone arm on the record with the needle resting in the eccentric groove of the record. In this position, the trip finger (78D), when riding over the ratchet screw on the trip plate (89), should be at an angle of 25° to 30° with respect to the screw. Adjust the screw (X) to obtain correct adjustment (Figure 3).
3. To adjust the trip receiver (78A), place the tone arm on the record with the needle resting in the eccentric groove of the record. The vertical center line of the ratchet screw and the trip finger (78D) should coincide. To make the proper adjustment, loosen screw (Z) slightly, and screw (Y) completely (Figure 3). Rotate the trip receiver (78A) about screw (Z), and tighten the screws.
4. The trip arm stop (78B) should engage the selector by approximately ⅛". To adjust, loosen screw (Y) slightly, and screw (Z) completely. Rotate the trip receiver about screw (Y) until the correct adjustment is obtained; then tighten the screws.

Record Shelf Adjustment

1. Turn the shelf to the 10" position.
2. Loosen the two hex-head screws that hold the record shelf assembly to the baseplate.
3. Place the Philco record shelf gauge, No. 45-1470 (also used for M-4), over the spindle and on to the record shelf.

4. Adjust the record shelf assembly until the large, curved part of the gauge drops even with the record shelf lips.
5. Push the record shelf and gauge lightly against the spindle; keep the lips of the record shelf in contact with the gauge.
6. Tighten the hex-head screws.

Push-Off Adjustment

1. Push control button (42) to "Rej."
2. Rotate the turntable 2½ revolutions, by hand. At this point, the push-off actuator (70) is moved by the cam gear roller (88C) to its most forward position.
3. Loosen the bar locking screw (69).
4. Squeeze the push-off bar ears (64 and 67) toward each other until the push-off slide plate (29) extends 1/32" beyond the lips of the shelf.
5. Tighten the screws.

RECORD PLAYER ADJUSTMENTS

Tone Arm Needle Pressure

The correct needle pressure for the L.P. arm is 6 to 7½ grams. To check the needle pressure, use the Philco Gram Scale, Part No. 45-9531. Place the scale on its side and set the pointer to the center line of the scale. This is the "0" point, and each small division on either side of "0" is equal to one gram. After the scale has been set, place it on the turntable with the guard on the scale in an open position, and at right angles.

Set the needle of the arm into the hole at the end of the pointer and check the reading. Needle pressure may be varied by adjusting the spring (28) in the various notches on the swivel (27).

Tone Arm Horizontal Friction

1. Hold the grams scale flat and set pointer to "0."
2. Take the tone arm off the rest post and place counterweights on top of the rear end until the tone arm is balanced in horizontal position.
3. Place the pointed end of the scale against the side of the tone arm head and move toward the spindle. Then move the tone arm away from the spindle. The horizontal friction is the average of the two readings taken. At no time should it take more than 2 grams pressure on the pointer to move the tone arm.

Pickup Holder

The pickup holder should be centrally spaced in the tone arm to prevent binding or rubbing of the pickup cartridge when it is vertically moved. In order to obtain correct adjustment, remove the tone arm (22), loosen the set screw holding the bracket in place, and centrally space the mounting. Leave a space of 1/32" between the tip of the ears on the holder and the inside surface of the tone arm. Tighten the screw and replace the tone arm.

Trip Switch Adjustment

1. Place the tone arm (22) on the rest post.
2. Loosen the trip arm clamp screw (44).
3. Make sure the mercury switch is in a horizontal position with the bracket and clip assembly (52C) engaging the ratchet latch plate (52B).
4. While holding the tone arm on the rest post, move the trip arm out until the leg on the rest trip arm (47) engages the bracket and trip ear, pivoting the bracket and trip, enough so that there is approximately 1/32" clearance between the long ear of the bracket and clip and the cut-out notch on the ratchet plate (52B).
5. Tighten the clamp screw (44).

Trip Finger Adjustment

1. Place the tone arm (22) in the finish groove of a record.
2. The trip finger should assume an angle of 25° to 30° when riding over the serrated portion of the ratchet latch (52B). Adjust the screw on the trip arm receiver to obtain the proper angle.

Selector Lever Stop Adjustment

The selector lever "throw" is adjusted by loosening the screw on the lock plate (54), Figure 3, and centering the lock plate so that, when the Standard-Play, Long-Play control (37) is in either position, the shift lever on the motor will not bind against either side.

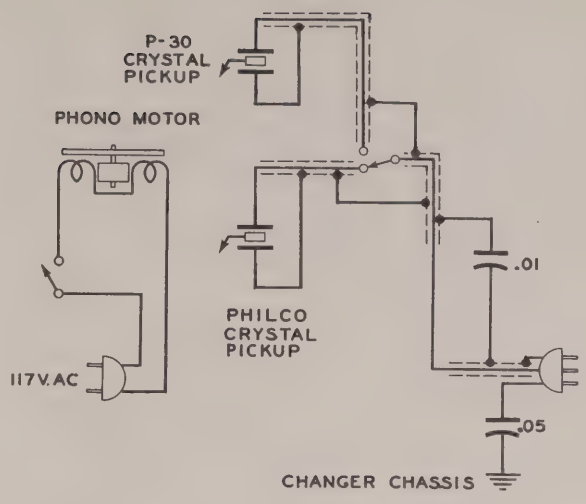

FIGURE 5—MODEL M-9C WIRING DIAGRAM

TROUBLES

Mechanism Does Not Stay in "Manual" Position

1. Springs (97) loose.

Changer Trips Continuously

1. Spring (80) missing.
2. Slider control bar (95) binding.
3. Trip-plate assembly (89) binding in an outward position.

Changer Fails to Trip

1. Spring that actuates retractable segment loose.
2. Trip-plate assembly (89) binding.

Tone Arm Does Not Set Down for 10-Inch Records

1. Spring (75A) loose, allowing the 12" selector (76) to lie in the path of the trip arm stop (78B).

Tone Arm Will Not Set Down for 12-Inch Records

1. Spring (75A) too strong, preventing the feeler from being depressed by the weight of the record.

LUBRICATION

The model M-9C record changer and player has been lubricated at the factory; further lubrication is not necessary. However, after a long period of time, or due to excessive use, or whenever a major part or assembly is to be replaced, the changer should be cleaned with carbon tetrachloride to remove all old grease, oil, and dirt.

The following parts are to be lubricated with a grease having a consistency of vaseline:

1. The push-off slide plate.
2. The three dimples and four upturned ears of the bridge assembly (93) and slide-control bar (95).
3. Cam-gear teeth, cam surfaces, and cam-gear spindle.
4. All points that slide on baseplate and other frictional surfaces.
5. Turntable shaft.
6. Tone arm shaft.

Parts to be oiled with S.A.E. 20 Oil:

1. Tone arm pivot pin where pin rides in elongated hole of tone arm . . . apply one drop.
2. Trip plate (89) bushing.
3. Spindle (1).
4. Cam-gear roller (88C).

CAUTION: Avoid overlubrication . . . overlubrication may cause sticking of parts. Do not allow any grease or oil to come in contact with the motor shaft, idler wheel, or turntable rim. If this occurs, remove the oil and grease immediately with carbon tetrachloride. Do not lubricate, at any time, the trip receiver (78A), trip finger (78D), ratchet screw on trip plate (89), selector (76), or any other parts of the record-player section.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	76-3926	Spindle
2	1W14460FA44	Crystal mounting screws 3-48 x 5/8"
2A	56-4601-2	Spacer—long
	56-4601-3	Spacer—short
3	35-2671-1	Crystal, standard
	45-1597	Needle
4		Lockwasher, hex nuts 3-48
5	35-3066-2	Turntable
6	35-2672FC55	Tone arm shell
7	56-4604FE15	Tone arm pivot pin
8	56-4631FA15	Tone arm lift pin
9	56-4603FA38	Tone arm bias spring
10	76-2982	Pull-cord assembly, record changer tone arm
11	76-4192	Baseplate
11A		Tone arm rest post (part of item 11)
12	76-2983FA2	Shaft and swivel assembly
13		Switch mounting screws 4-40 x 1/4"
14		Lockwasher
15	45-6481	Idler wheel
16		Mounting screws 6-32 x 5/8
17		Mounting washers
18	56-4926	Spacer
19	54-4501	Motor mounting grommet
20	35-1371	Motor (including shift lever and large pulley)
	45-6479	Pulley belt
21	56-5882	Counterweight
22	45-1610	Tone arm shell assembly—LP
23	76-2882-1	Pull-cord assembly, record player tone arm
24		Tone arm mounting bracket (part of item 27)
25		Tone arm pivot pin (part of item 27)
26	45-1609	Pickup and needle assembly
	35-2678	Needle for special crystal
	76-4086	Pickup bracket and hinge assembly
27	76-4335	Pivot assembly (including items 24, 25, 27, and 28)
28		Pressure spring (part of item 27)
29	56-4594FA37	Push-off slide plate
30	54-4460	Rubber bumper
31	1W60981FE7	"E" washer (for upper bearing)
32	56-5903	Upper bearing
	54-4624	Grommet for upper bearing (item 27)
33	56-5987	Stanchion
34	76-2984	Push-off cover assembly
35	56-4593	Fulcrum plate
36	56-4629	Push-off saddle (record shelf assembly)
37	54-4634	Standard-play, long-play control
38	56-4630FA38	Shelf spring
39	56-4627FA3	Retainer spring
40	56-4628FA38	Spring ring
41	42-1873	Switch
42	54-4479-1	Rej.-Auto.-Man.
43		Spacer
44		Trip arm clamp screw
45		Flat washer
46		Trip arm clamp—nut
47	76-4198	Reset trip arm
48		Tone arm shaft support (part of item 11)
49	56-5916	Thrust bearing
50	27-4099-3	Rubber grommet
51	1W60977FE7	"E" washer
52	76-4196	Switch bracket
52A		Rubber grommet
52B	76-4197	Ratchet latch plate
	1W60977FE7	"E" washer for item (52B)
52C	76-4195	Bracket and clip assembly
53		Switch bracket mounting screw
54	56-5986	Lock plate
55		Rubber grommet
56	1W56306FE15	Spring washer
57	1W60977FE7	"E" washer
58	56-5985	Selector lever
59	56-5995	"V" spring (selector lever)
60	56-5990	Lifter link
61	56-4595FA3	Push-off rod
62	56-5991	Selector link
63	56-4596FA3	Push-off hanger
64	56-4597FA3	Push-off bar
65	56-4600FA38	Return spring
66	56-4599FA3	Safety slider
67	56-4774FA3	Rear push-off bar
68		Lockwasher
69		Screw 6-32 x 1/4"
70	56-4588FA3	Push-off actuator
71	76-2987	Tone arm actuator lever
72	76-4193	Lift actuator lever
73	1W60980FE5	"E" washer
74	56-4617FA3	Selector hinge
75	56-4616FE15	Feeler
75A	56-4670FA38	Feeler spring
76	56-4618FE15	Selector
77	1W36521FA3	Escutcheon pin
	1W57117	Tubular clip (for item 77)
78	76-4204	Trip arm
78A	56-6404	Trip receiver, record player tone arm
78B	56-4614	Trip arm stop
78C	56-4613FA38	Stop spring
79	56-4585FA3	Index lever
80	56-4603FA38	Index spring
81		Clamp screw 10-32 x 1
82		Spring for short link
83		Flat washer
84		Nut 10-32
85		Spring for long link
86	56-4606FA3	Long link
87	56-4607FA3	Short link
88	76-2989	Cam-gear assembly
89	76-2990	Trip-plate assembly
90	1W52627	Cam-gear washer
91	1W60980FE5	"E" washer
92	76-2991	Bearing assembly
93	76-2978	Bridge assembly (including item 95)
94	56-5644	Spindle spring
95		Slider control bar (part of item 93)
96	56-4589FA3	Control link rod
97	56-4610	"V" spring
98		Lockwasher
99		Mounting screw 6-32 x 1/4"
100	42-1750-3	Motor switch
101	76-2140-2	Mercury switch

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RCA VICTOR MODELS 8T241, 243, 244; 8TV321, B; 8TV323, B; 9T240, 246; 9TC240, 9TW333

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MODEL 8T244

MODEL 8TV321

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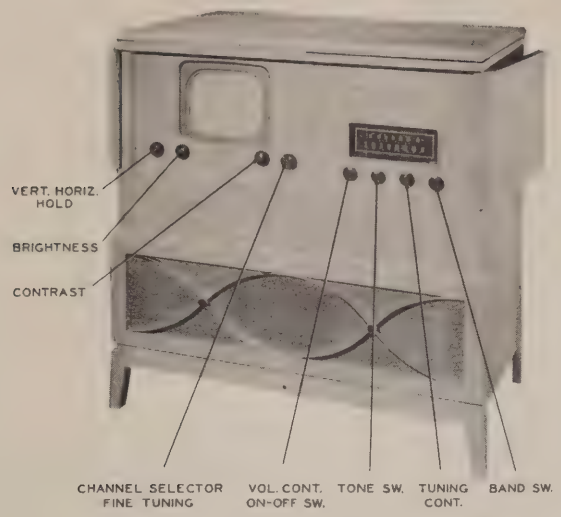

TRADE NAME	RCA Victor	MODEL	TV CHASSIS	RADIO CHASSIS
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		8T243	KCS 28	
		8T244	KCS 28	
		9T240	KCS 28,A	
		9T246	KCS 28C	
		9TC240	KCS 28B	
		8TV321	KCS 30-1	RC 616 C
		8TV321B	KCS 30-1	RC 616 K
		8TV323	KCS 30-1	RC 616 B
		8TV323B	KCS 30-1	RC 616 J
		9TW333	KCS 30-1	RC 616 N

MANUFACTURER RCA Victor Div., Radio Corp. of America, Camden, New Jersey

TYPE SET AM-FM-Phono-TV Receiver (Some Models TV Only)

TUBES Thirty Three-Model 9TW333
Thirty Two-Models 8TV321, 8TV321B, 8TV323, 8TV323B
Twenty Four-8T241, 8T243, 8T244, 9T240, 9T246, 9TC240

POWER SUPPLY 110-120 Volts AC

RATING: 2.3 Amp. @ 117 Volts AC (TV)
.58 Amp. @ 117 Volts AC (Radio)

FREQUENCY RANGE AM 540-1600KC , FM 88-108MC, TV Channels 2 thru 13

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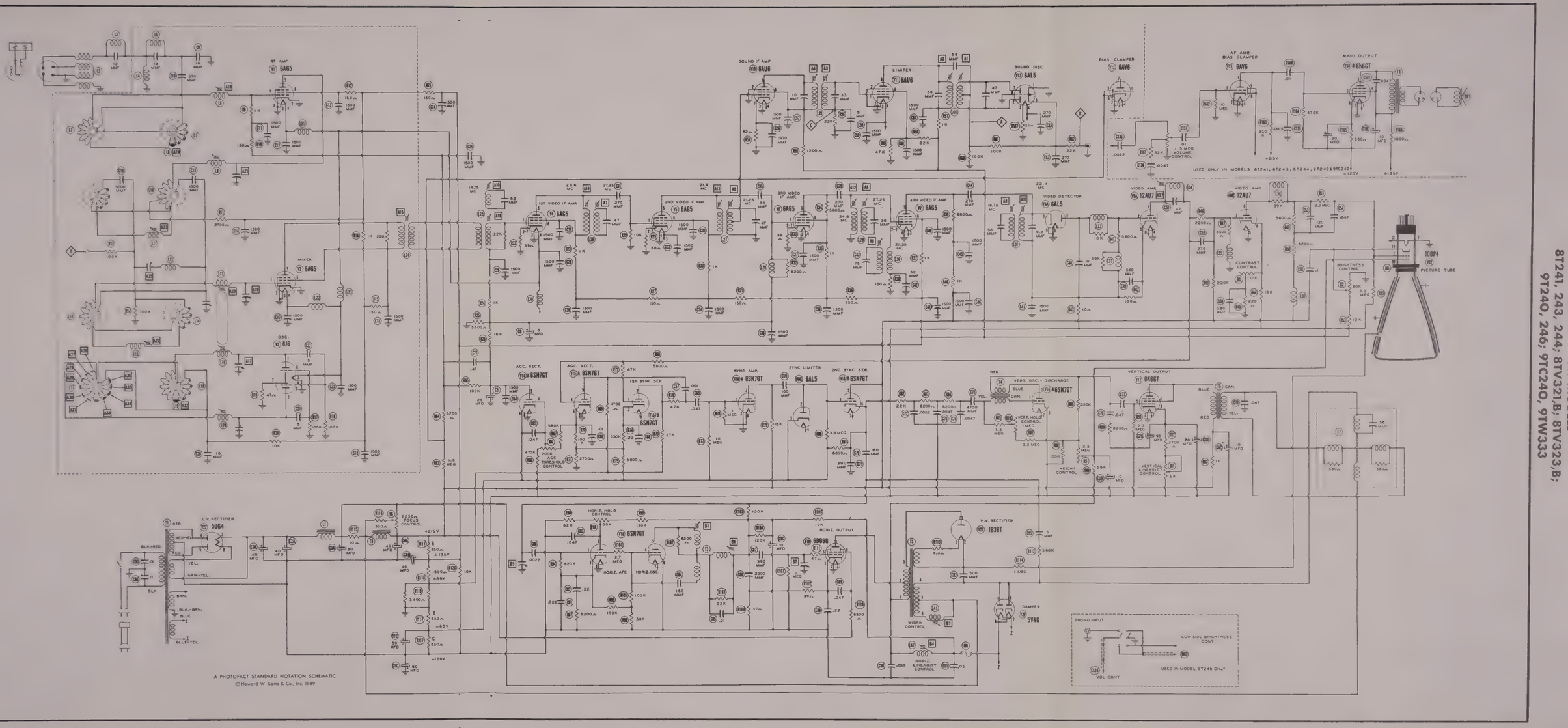

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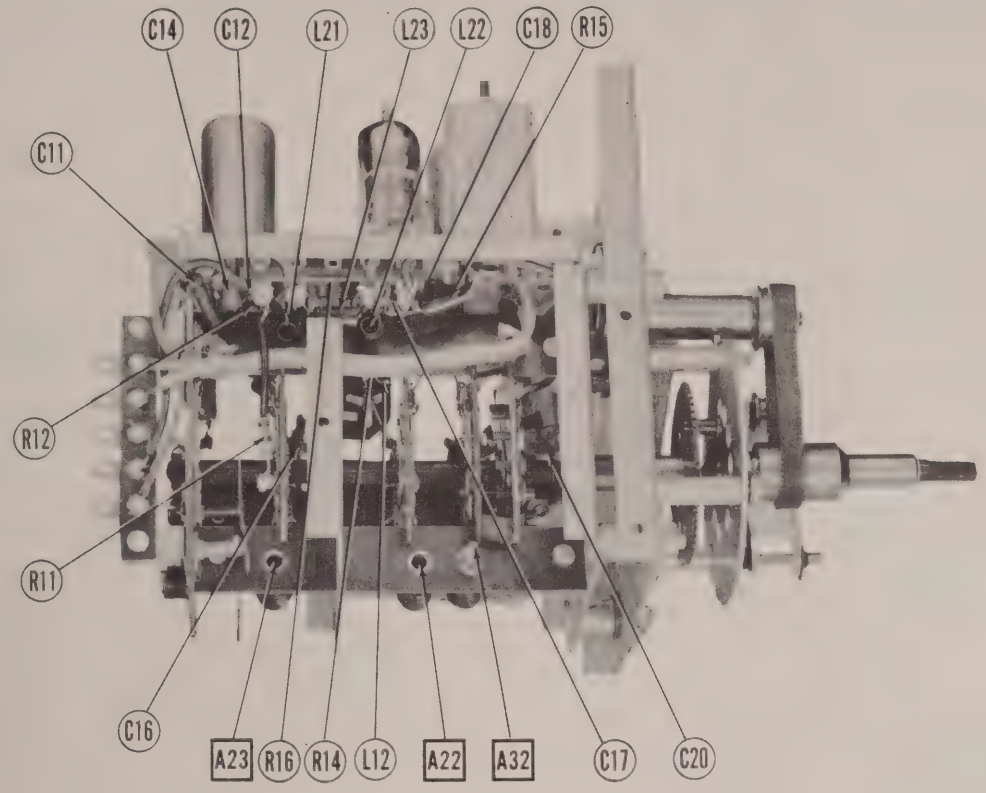
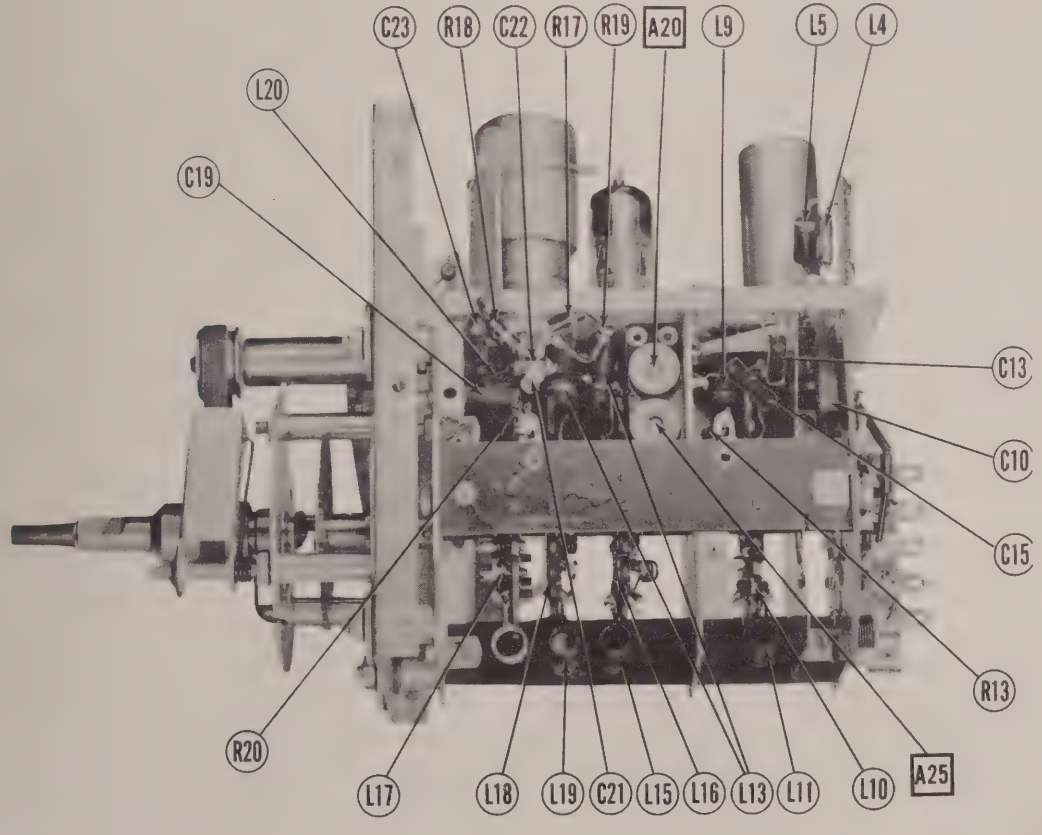
CHASSIS TOP VIEW

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE

TV-ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

This receiver may be aligned without the kinescope being connected and with the high voltage disabled. The high voltage may be disabled by removal of the horizontal oscillator tube (V18).

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.05MFD	High side to pin 1 (Grid) of 6AU6 (V11). Low side to chassis.	21.25MC (No Mod.)	Any	DC Probe thru 1 Meg to Point (A) Common to chassis.	A1,A2	Detune A1. Adjust A2 for maximum deflection.
2.	.05MFD	"	"	"	DC Probe thru 1 Meg to Point (B) Common to chassis.	A1	Adjust for zero reading. A positive and negative reading is obtained on either side of the correct setting.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	.05MFD	High side to pin 1 (Grid) of 6AU6 (V11). Low side to chassis.	21.25MC (1MC Sweep)	21.25MC	Any	Vert. Amp. to Point (B) Low side to chassis.		Check symmetry of wave-form of discriminator output. If necessary, adjust A1 to position 21.25MC marker at center of pattern as per Fig 1. Retouch A2 for maximum amplitude and straightness of line running diagonally from peak to peak.
4.	.05MFD	High side to pin 1 (Grid) of 6AU6 (V10). Low side to chassis.	"	"	"	Vert. Amp. thru 33KΩ to Point (C) Low side to chassis.	A3,A4	Adjust for maximum amplitude and symmetry as per Fig 2.

VIDEO IF ALIGNMENT

Care must be exercised when connecting the VTVM across R41 since the bottom end of R41 returns to approximately -120 volts. Do not permit the VTVM case to become grounded and do not touch the meter case and the receiver chassis or any adjacent ground (other test equipment etc.) at the same time as a "shock" would be encountered.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.					DC Probe to the junction of R25 and R26. Common to chassis.		Remove the AGC amplifier (V14) and connect a 250KΩ potentiometer between pins 5 and 6 of V14 socket. Adjust the potentiometer until VTVM reads -4.5 volts. Leave the potentiometer at this setting.
6.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	21.25MC (No Mod.	13	Across R41 (See above)	A5	Adjust for minimum deflection.
7.		"	"	"	"	A6	"
8.		"	27.25MC (No Mod.)	"	"	A7	"
9.		"	"	"	"	A8	"
10.		"	19.75MC (No Mod.)	"	"	A9	"
11.		"	"	"	"	A10	"
12.		"	22.5MC (No Mod.)	"	"	A11	Adjust for maximum deflection.
13.		"	24.6MC (No Mod.)	"	"	A12	"
14.		"	22.0MC (No Mod.)	"	"	A13	"
15.		"	25.9MC (No Mod.)	"	"	A14	"

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	25MC (10MC Sweep)	21.95MC 24.8MC	13	Vert. Amp. to pin 1 (Plate) of 12AU7 (V9). Low side to chassis.	A15, A16	Connect 300Ω shunts across the primary windings of L26, L27, L29 and L31. Reconnect VTVM as in step 5 and adjust potentiometer to give -2 volt reading. Adjust A15 and A16 for proper response and placement of markers as per Fig 3.
17.		"	"	"	"	"		Remove the 300Ω shunts and adjust the bias potentiometer to give scope pattern of 15 volts peak to peak. If necessary, slightly retouch A11, A12, A13, A14, A15, and A16 for correct response as per Fig 4.

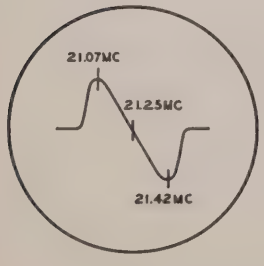


FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

TV-ALIGNMENT INSTRUCTIONS (CONT.)

RF ALIGNMENT

Set fine tuning control at the midpoint of its range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
18.	Direct	Across antenna terminals	215.75MC	13	DC Probe thru 1 Meg to Point (B). Common to chassis.	A17	Adjust for zero reading. A positive and negative reading is obtained on either side of the correct setting.
19.					DC Probe to junction of R25 and R26. Common to chassis.		Adjust bias potentiometer connected as in step 5 to -1.5 volts. Also remove 1st video IF tube (V4) for the remainder of the RF alignment.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
20.	Two 125Ω carbon res.	Across antenna terminals with 125Ω resistor in each generator lead.	177MC (10MC Sweep)	175.25MC 179.75MC	7	Vert. Amp. to Point (D). Low side to chassis.	A18,A19 A20,A21	Adjust A18, A19, A20 and A21 for flat top response pattern with markers above 90% as per Fig 5.
21.	"	"	207MC (10MC Sweep)	205.25MC 209.75MC	12	"	A18	If necessary, slightly retouch A18 for maximum response and minimum slope at top of curve.
22.	"	"	177MC (10MC Sweep) 183MC (10MC Sweep) 189MC (10MC Sweep) 195MC (10MC Sweep) 201MC (10MC Sweep) 207MC (10MC Sweep) 213MC (10MC Sweep)	175.25MC 179.75MC 181.25MC 185.75MC 187.25MC 191.75MC 193.25MC 197.75MC 199.25MC 203.75MC 205.25MC 209.75MC 211.25MC 215.75MC	7 8 9 10 11 12 13	"		Check response for all high band channels. If either marker on any one channel falls below 80%, switch to that channel and retouch A18, A19, A20 and A21. Then recheck all channels to see that they have not been appreciably affected.
23.	"	"	85MC (10MC Sweep)	83.25MC 87.75MC	6	"	A22, A23, A24, A25	Adjust A22, A23, A24 and A25 for flat topped response pattern as per Fig 5.
24.	"	"	79MC (10MC Sweep) 69MC (10MC Sweep) 63MC (10MC Sweep) 57MC (10MC Sweep)	77.25MC 81.75MC 67.25MC 71.75MC 61.25MC 65.75MC 55.25MC 59.75MC	5 4 3 2	"		Check response for all low-band channels. If either marker falls below 80%, switch to that channel and retouch A22, A23, A24 and A25. Then recheck all the channels to see that they have not been appreciably affected.

OSCILLATOR ALIGNMENT

Leave the fine tuning control at the midpoint of its range. Replace tubes V4 and V14 and remove the bias potentiometer.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
25.	Direct	Across antenna terminals	215.75MC	13	DC Probe thru 1 Meg to Point (B). Common to chassis.	A17	Adjust for zero reading. A positive and negative reading is obtained on either side of the correct setting.
26.	Direct	"	209.75MC	12	"	A26	"
			203.75MC	11		A27	
			197.75MC	10		A28	
			191.75MC	9		A29	
			185.75MC	8		A30	
			179.75MC	7		A31	
			87.75MC	6		A32	
			81.75MC	5		A33	
			71.75MC	4		A34	
			65.75MC	3		A35	
			59.75MC	2		A36	

4.5 MC VIDEO TRAP ADJUSTMENT

Short out the trap winding of L27 by shorting pin 1 of the 6AU6, 1st sound IF amplifier V10, to chassis. Tune in a strong station. If a 4.5MC beat appears in the picture, adjust A37 until the beat is eliminated.

AGC THRESHOLD ADJUSTMENT

Connect oscilloscope to pin 1 of 12AU7 (1st Video Amp.-V9) and chassis. Tune in station and turn contrast control clockwise: Adjust R4 for maximum gain without clipping the sync pulses visable on scope.

RADIO ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

When aligning the AM IF transformers use alternate loading with a 47KΩ resistor; that is, when aligning the secondary shunt the primary winding of the same transformer with 47KΩ resistor. When aligning the primary, shunt the secondary.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
27	.01MFD	High side to Point E. Low side to chassis.	455KC (400∿ Mod.)	AM (pos. 3 clock-wise)	Quiet point at low freq. end of dial.	Across voice coil	A38, A39, A40, A41	Use alternate loading as described above. Adjust for maximum output.
28	220MMF	High side to terminal 1 on antenna terminal strip. Low side to chassis.	1400KC	"	1400KC (5 inches to right of extreme left hand limit mark.)	"	A42, A43	Adjust for maximum output.
29	220MMF	"	600KC	"	600KC (1 inch to right of extreme left hand limit mark on dial backplate.)	"	A44	Rock tuning gang and adjust for maximum output. Repeat steps 28 and 29.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

When aligning the FM IF transformers, use alternate loading with a 680Ω resistor; that is, when aligning the secondary shunt the primary winding of the same transformer with 680Ω. When aligning the primary, shunt the secondary.

Connect two matched 100KΩ (±1%) resistors in series from Point F to chassis. The junction of these two resistors is alignment Point H as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
30	.01MFD	High side to pin 1 (Grid) of 6AU6 (V25). Low side to chassis.	10.7MC (Unmod.)	FM (pos. 4 clock-wise)	Low freq. end of dial.	DC Probe to Point F. Common to chassis.	A45	Adjust for maximum deflection.
31	.01MFD	"	"	"	"	DC Probe to Point G. Common to Point H.	A46	Adjust for zero reading. A positive and negative reading is obtained on either side of the correct setting. Repeat steps 30 and 31.
32	300Ω carbon res.	High side to terminal 1 of antenna terminal strip. Low side to chassis.	"	"	"	DC Probe to Point F. Low side to chassis.	A47, A48, A49, A50	Alternately load primary and secondary windings with 680Ω. Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
30	.01MFD	High side to pin 5 (Grid) of 6J6 (V23). Low side to chassis.	10.7MC (450KC Sweep)	FM	Point of non interference	Vert. Amp. to Point F. Low side to chassis.	A47, A48, A49, A50	Disconnect stabilizer cap. (C8). Adjust A46 thru A49 for maximum amplitude and symmetry as per Fig 6.
31	.01MFD	"	"	"	"	Vert. Amp. to Point G. Low side to chassis.	A45, A46	Reconnect capacitor C8. Adjust A45 for maximum amplitude and straightness of crossover lines as per Fig 7. Adjust A46 so crossover point occurs at center of pattern. Continue with step 33.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
33	300Ω carbon res.	High side to terminal 1 of antenna terminal strip. Low side to chassis.	106MC	FM	106MC (5 1/4" from extreme left hand limit mark on dial backplate.)	DC Probe to Point F. Common to chassis.	A51, L45	Turn A51 to maximum capacity. Expand or compress coil turns of L45 for maximum deflection on VTVM. Then adjust A51 for maximum deflection.
34	"	"	90MC	"	90MC (1 9/16" from extreme lefthand limit mark on dial backplate)	"	L43	Rock tuning gang and expand or compress the coil turns of L43 for maximum deflection. Repeat steps 33 and 34 until no further improvement can be made.

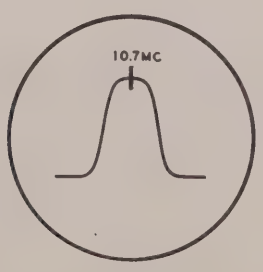


FIG. 6

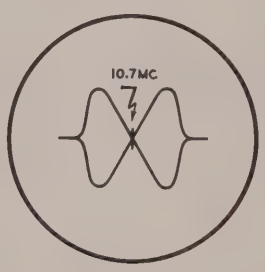
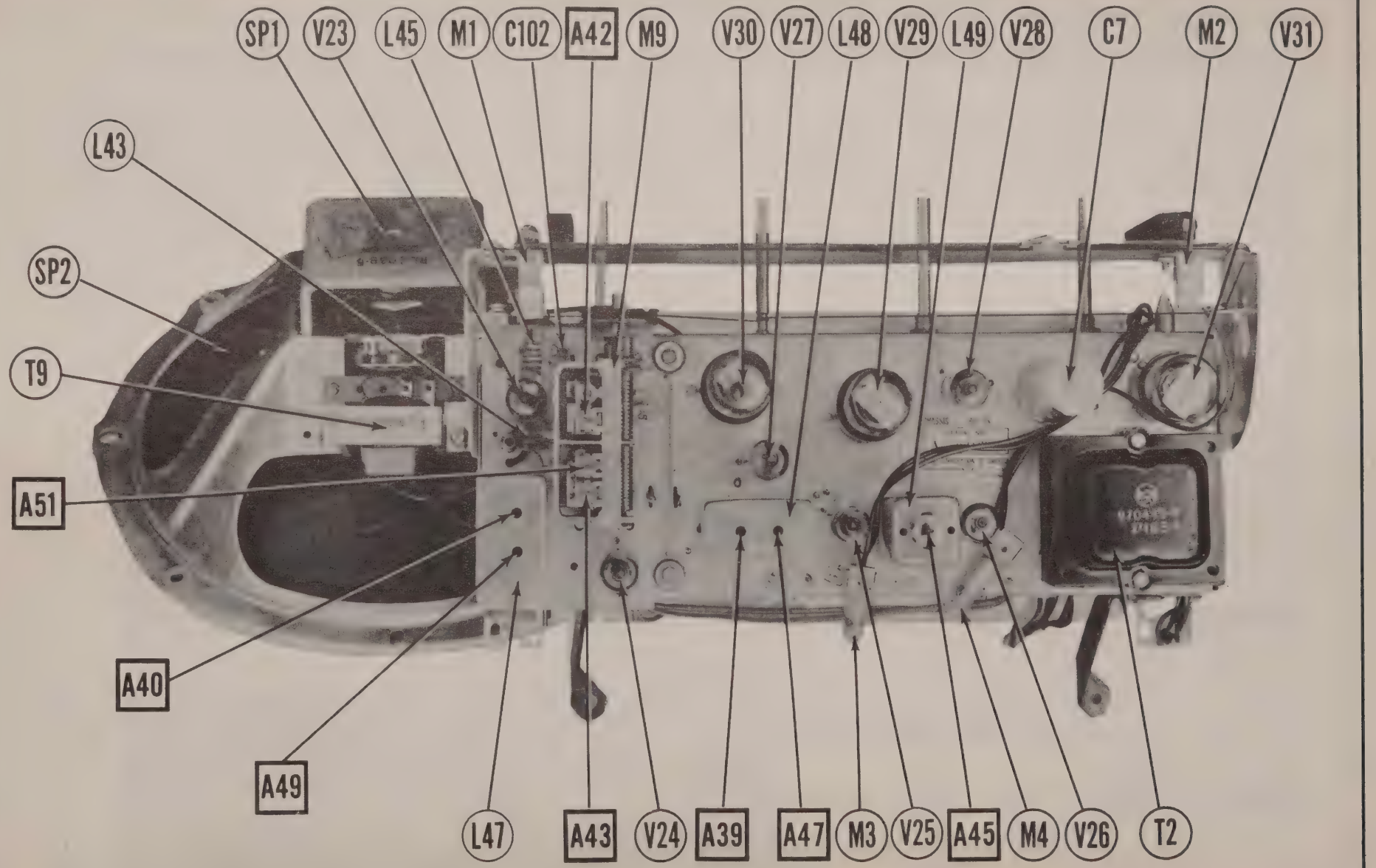
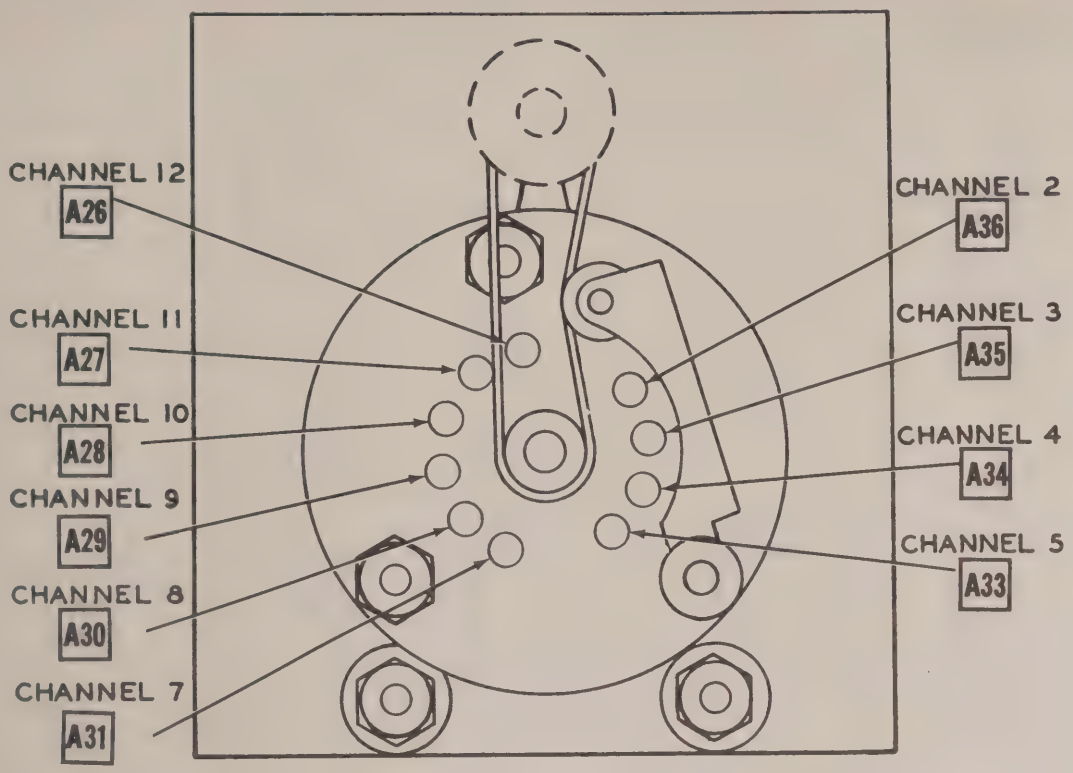


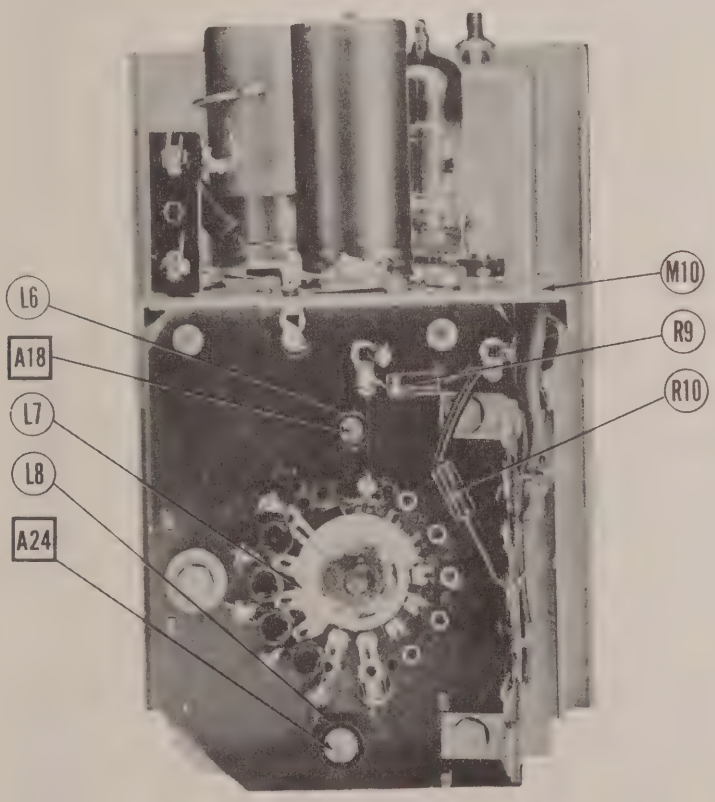
FIG. 7



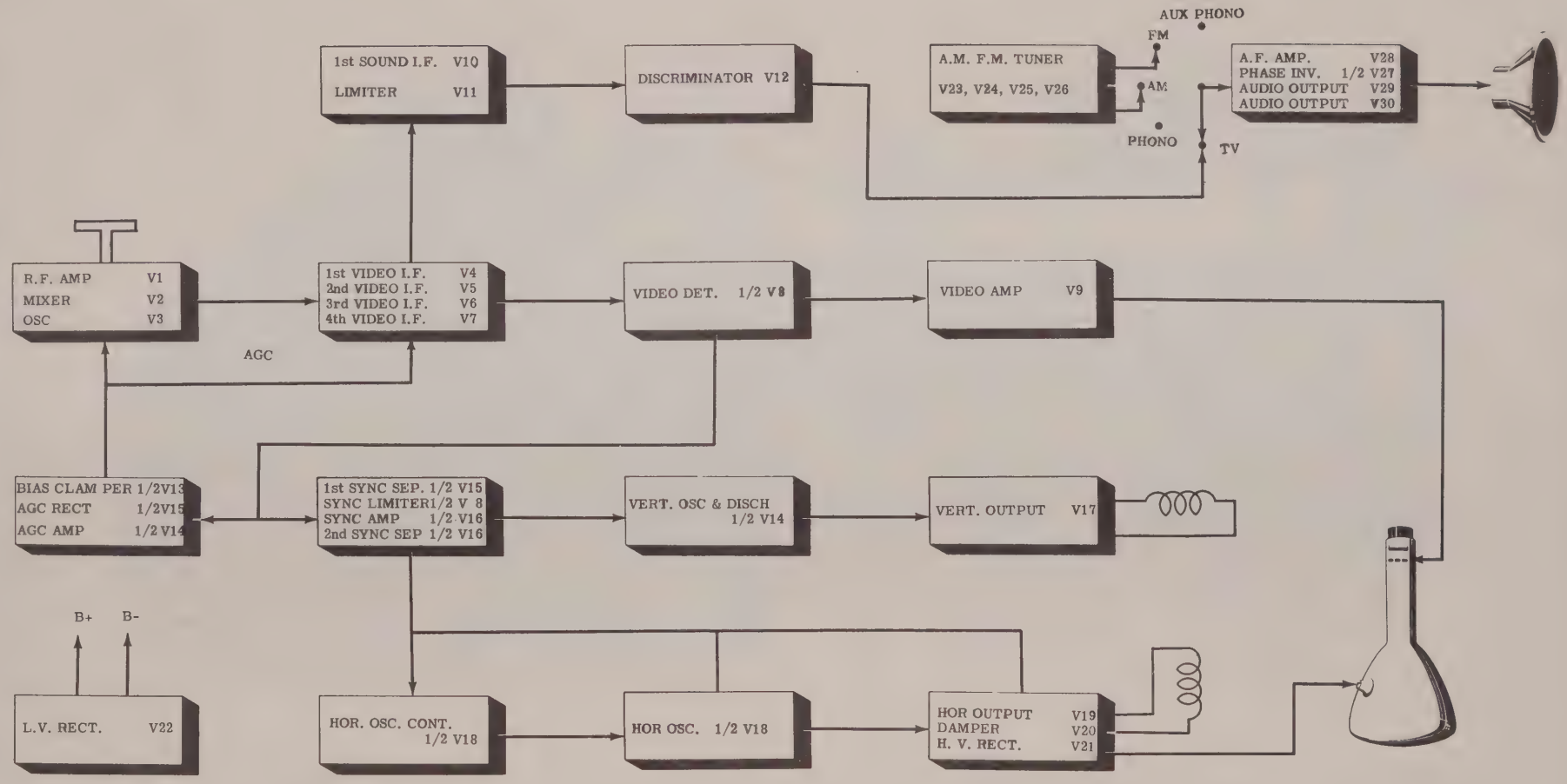
RADIO CHASSIS–TOP VIEW



OSCILLATOR ALIGNMENT POINTS



RF TUNER-REAR VIEW



BLOCK DIAGRAM

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	6J6	6J6	7BF	
V4	1st Video IF Amp.	6AG5	6AG5	7BD	
V5	2nd Video IF Amp.	6AG5	6AG5	7BD	
V6	3rd Video IF Amp.	6AG5	6AG5	7BD	
V7	4th Video IF Amp.	6AG5	6AG5	7BD	
V8	Video Det.-Sync Limiter	6AL5	6AL5	6BT	
V9	Video Amp.	12AU7	12AU7	9A	
V10	1st Sound IF Amp.	6AU6	6AU6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Sound Disc.	6AL5	6AL5	6BT	
V13	Bias Clamper	6AV6	6AV6	7BT	
V14	AGC Amp.-Vert. Osc.-Disch.	6SN7GT	6SN7GT	8BD	
V15	AGC Rect.-1st Sync. Sep.	6SN7GT	6SN7GT	8BD	
V16	Sync. Amp.-2nd Sync. Sep.	6SN7GT	6SN7GT	8BD	
V17	Vert. Output	6K6GT	6K6GT	7S	
V18	Hor. Osc. Cont.-Hor. Osc.	6SN7GT	6SN7GT	8BD	
V19	Hor. Output	6BG6G	6BG6G	5BT	
V20	Damper	5V4G	5V4G	5L	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	
V23	Converter	6J6	6J6	7BF	
V24	IF Amp.	6BA6	6BA6	7BK	
V25	FM 2nd IF Amp.	6AU6	6AU6	7BK	
V26	Ratio Det.	6AL5	6AL5	6BT	Models 8TV321, 8TV323, 9TW333 only
V27	Det.-AVC-Phase Inv.	6AV6	6AV6	7BT	
V28	AF Amp.	6AV6	6AV6	7BT	
V29	Audio Output	6V6GT	6V6GT	7AC	
V30A	Audio Output	6V6GT	6V6GT	7AC	
B	Audio Output	6K6GT	6K6GT	7S	Table and consolette models only.
V31	Rectifier	6X5GT	6X5GT	6S	Model 8TV321, 8TV323, 9TW333 only.
V32	Picture Tube	10BP4	10BP4	12D	
V33	Phono Pre-Amp.	6BF6	6BF6	7BT	Used in Model 9TW333 only.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	73582	AFH82J16E	UP9CJ915		TVL-25	◓ Filter
B	10	450						■ Filter ‡
C	80	200						▲ Filter
C2A	40	450	73583	AFH8J1810D	UP9CJ913		TVL-27	◓ Filter
B	90	150						■ Vert. Output Cath. Byp.
C	50	150						▲ Filter
C3A	60	450	73581	AFH1222J4D	UP9DJ914		TVL-68	◓ Filter
B	10	450						■ Vert. Osc. Plate Dec.
C	10	450						▲ Decoupling
D	20	150						Vert. Output Cath. Bypass **
C4A	40	450	71432	AFH882J	UP9CJ897		TVL-30	◓ Filter
B	40	450						■ Filter
C	10	450						▲ Vert. Output Plate Dec.
C5	25	50	53147	PRS50/25	BR255		TVA-15	AGC Filter
C6	5	50	74106	PRS150/4	BR550		TVA-13	AGC Filter ††
C7A	30	350	73372	AF64H4A	UP3335C		EL-323♦	■ Filter
B	30	300					UT-83	▲ Filter
C	20	25						Output Cath. Bypass
C8	2	50	73747	PRS150/4	BBR2-50T		TVA-12	Stabilizing Cap.
C9	18		54207					Fixed Trimmer
C10	270	500	73091	1468-00025	5W5T25	GP2K-250	1FM-325	RF Coupling
C11	1500		53494			GP2L-0015		AGC Filter
C12	1500		53494			GP2L-0015		RF Fil. Bypass
C13	1500		53494			GP2L-0015		RF Screen Bypass
C14	1500		53494			GP2L-0015		Decoupling
C15	1500		53494			GP2L-0015		RF Coupling
C16	5000		73473					RF Coupling
C17	1500		53494			GP2L-0015		Conv. Fil. Bypass
C18	1500		53494			GP2L-0015		Conv. Decoupling
C19	1500		53494			GP2L-0015		Osc. Plate Decoupling
C20	10		53511			NPOK-10		Fixed Trimmer
C21	5		74035			NPOK-5		Osc. Feedback
C22	5		74035			NPOK-5		Osc. Feedback
C23	1500		53494			GP2L-0015		Osc. Fil. Bypass
C24	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C25	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	AGC Filter
C26	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	AGC Filter
C27	.47	200	73787	P288-47	GT2P5		TC-5	AGC Filter
C28	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	1st V. IF Fil. Bypass
C29	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	1st V. IF Decoupling
C30	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	" " " "
C31	270	500	73091	1468-00025	5W5T25	GP2K-250	1FM-325	IF Coupling
C32	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd V. IF Fil. Bypass
C33	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	2nd V. IF Decoupling
C34	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	Decoupling
C35	33	500	74105	1468-00004	5W5Q4	NP0L-33	1FM-44	IF Coupling
C36	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	AGC Filter
C37	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	3rd V. IF Decoupling
C38	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	Decoupling
C39	270	500	73091	1468-00025	5W5T25	GP2K-250	1FM-325	IF Coupling
C40	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	4th V. IF Screen Bypass
C41	1500		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C42	82		64062	1468-0001	5W5T1	GP1K-100	1FM-31	4th V. IF Cath. Bypass
C43	75			1469-000075		NP0M-75		Fixed Trimmer

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA RCA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C44	270	500	73861	1468-00025	SWET25	GP2K-250	1FM-315	IF Coupling
C45	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	4th V. IF Plate Dec.
C46	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	RF Bypass
C47	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	RF Bypass
C48	10	500	73818	1468-00001	SWS01	GP1K-10	MS-41	V. Diode Filter
C49	560	500	73646	1468-0005	1WST6	GP2K-500	MS-36	V. Amp. Cath. Bypass
C50	560	500	73646	1468-0005	1WST6	GP2K-500	MS-36	V. Output Cath. Bypass
C51	47			1469-00005	SR5Q5	NP0M-50	MS-45	Fixed Trimmer
C52	270		73922	1468-00025	SWST25	GP2K-250	1FM-325	Video Coupling
C53	120		73921	1468-00015	SWST15	GP2K-150	1FM-315	Video Coupling
C54	.047	400	73553	P488-047	GT4S5		TM-15	" "
C55	.1	600	73557	P688-1	GT6P1		TM-1	Pic. Tube Cath. Dec.
C56	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	1st S. Cath. Bypass
C57	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	1st S. Decoupling
C58	51		73656	1468-00005	SWS05	GP1K-50	1FM-305	Limiter Grid Filter *
C59	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	Limiter Fil. Bypass
C60	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	Limiter Screen Bypass
C61	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	Limiter Plate Dec.
C62	270		73922	1468-00025	SWST25	GP2K-250	1FM-325	RF Bypass
C63	270		73922	1468-00025	SWST25	GP2K-250	1FM-325	Disc. Fil. Bypass †
C64	1500		53494	1467-0015	1WSD15	GP2L-0015	1FM-215	AGC Amp. Plate Byp.
C65	.047	200	73558	P288-047	GT2S5		TM-15	AGC Amp. Grid Filter
C66	.01	400	73561	P488-01	GT4S1	GP2-335-01	TM-11	Hor. Pulse Forming
C67	.001	600	73001	P688-001	GT6D1	GP2L-001	TM-21	Hor. Sync. Coupling
C68	.22	200	73562	P488-22	GT2S25		TM-15	Vert. Pulse Forming
C69	.047	400	73553	P488-047	GT4S5		TM-15	Sync. Coupling
C70	100	500	73648	1468-0001	SWST1	GP2K-100	1FM-31	" " "
C71	390	500	73642	1469-0004	5RST4		MS-34	2nd Sync. Sep. Cath. Byp.
C72	.0022	600	73595	P688-0022	GT6S22	GP2M-002	TM-22	Integrator Net.
C73	.0047	600	73550	P688-0047	GT6D5	GP2M-005	TM-25	" "
C74	.0047	600	73550	P688-0047	GT6D5	GP2M-005	TM-25	" "
C75	4700	500	73908	P688-0047	1D5D5	GP2M-005	1FM-25	Vert. Osc. Grid Cap.
C76	.047	600	73553	P688-047	GT6S5		TM-15	Vert. Discharge
C77	.1	400	73561	P488-1	GT4P1		TM-1	Vert. Sweep Coupling
C78	.047	200	73558	P288-047	GT2S5		TM-15	Vert. Def. Coils Bypass
C79	180	500	51416	1468-0002	SWST2	GP2K-200	1FM-32	Hor. Sync. Coupling
C80	.0022	600	73595	P688-0022	GT6S22	GP2M-002	TM-22	" " "
C81	.022	400	73562	P488-022	GT4S2		TM-12	AFC Filter
C82	.22	400	73823	P488-22	GT4P25		TC-2	" "
C83	.047	600	73562	P688-047	GT6S5		TM-15	AFC Plate Bypass
C84	180	1000	73123					Hor. Osc. Grid Cap.
C85	.01	600	73594	P688-01	GT6S1		TM-11	Fixed Trimmer
C86	2200	500	73895					Hor. Discharge
C87	390	500	73642	1469-0004	5RST4		MS-34	Hor. Sweep Coupling
C88	.22	400	73823	P488-22	GT4P25		TC-2	Hor. Output Cath. Byp.
C89	.047	1000	73564	P1088-047	GT16S5		TM-15	Hor. Output Screen Byp.
C90	.033	1000	73566	P1088-033				Damper Filter
C91	.05	1000	73567	P1088-05	GT16S5		TR-15	" "
C92	500	2000	71490				410-500	HV Filter
C93	.01	400	73561	P488-01	GT4S1		TM-11	Line Filter
C94	.01	400	73561	P488-01	GT4S1		TM-11	" "
C95	5	1500	73499					AFC Feedback
C96	180		53494	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Coupling
C97	180		71602					Fixed Trimmer
C98	.01	400	73617	P488-01	GT4S1	GP2-335-01	TM-11	Osc. Plate Decoupling
C99	2		73666					Osc. Feedback
C100	68		32133	1469-00007	5R5Q7			" "
C101	15		31353			GP1K-15	MS-415	Osc. Feedback
C102	56		73667					Fixed Padder
C103	5			1469-000005	5R5V5	NP0K-5	MS-55	Fixed Trimmer †
C104	150		42125	1468-00015	5WST15	JFK-150	1FM-315	Osc. Grid Cap.
C105	.005	400	72791	P688-005	GT6D5	JP2M-005	TM-25	Conv. Plate Decoupling
C106	47		39042	1468-00005	5WS05	GP1K-50	1FM-45	Conv. Fil. Bypass
C107	100		39396	1469-0001	5R5T1	N750L-100	MS-31	Fixed Trimmer
C108	.5	200	73596	P288-05	GT2S5		TM-15	AVC Filter
C109	.005	400	72791	P688-005	GT6D5	GP2M-005	TM-25	1st IF Screen Bypass
C110	.005	400	72791	P688-005	GT6D5	GP2M-005	TM-25	1st IF Decoupling
C111	150		42125	1468-0015	5WST15	GP2K-150	1FM-315	Diode RF Filter
C112	150		42125	1468-0015	5WST15	GP2K-150	1FM-315	" " "
C113	.005	100	71926	P688-005	GT6D5	GP2M-005	TM-25	2nd IF Cath. Bypass
C114	.005	400	72791	P688-005	GT6D5	GP2M-005	TM-25	2nd IF Screen Bypass
C115	.01	100	71963	P488-01	GT2S1	GP2-335-01	TM-11	2nd IF Fil. Bypass
C116	.005	400	72791	P688-005	GT6D5	GP2M-005	TM-25	2nd IF Decoupling
C117	330	500	39640	1468-0003	5WS7	GP2K-300	1FM-33	Diode Load Cap +
C118	360	500	39640	1468-0003	5WS7	GP2K-300	1FM-33	Diode Load Cap +
C119	.005	100	71926	P688-005	GT6D5	GP2M-005	TM-25	De-emphasis
C120	.003	100	72659	P688-003	GT6D3	GP2M-003	TM-23	Audio Coupling
C121	.002	200	73750	P688-002	GT6D2	GP2M-002	TM-22	Tone Comp.
C122	.2	200	71928	P488-02	GT2S2		TM-12	" "
C123	.015	200	71820	P288-015	GT2S15			" "
C124	.003	400	72573	P688-003	GT6D3	GP2M-003	TM-23	" "
C125	.01	100	71923	P488-01	GT2S1	GP2-335-01	TM-11	Audio Coupling
C126	.005	200	71926	P688-005	GT6D5	GP2M-005	TM-25	AVC Filter †
C127	150		42125	1468-00015	5WST15	GP2K-150	1FM-315	AF Plate Bypass
C128	.01	400	72827	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C129	.01	400	72827	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C130	150		42125	1468-00015	5WST15	GP2K-150	1FM-315	Phase Inv. Plate Byp.
C131	.02	400	73653	P488-02	GT4S2		TM-12	Audio Coupling
C132	.0035	1000	73646	P1088-0033	GT16D3		MS-23	Output Plate Bypass
C133	.0035	1000	73646	P1088-0033	GT16D3		MS-23	" " "
C134	.01	100	71923	P488-01	GT2S1	GP2-335-01	TM-11	Output Fil. Bypass
C135	.005	100	71926	P688-005	GT6D5	GP2M-005	TM-25	DAVC Decoupling
C136	.0022	600	72303	P688-0022	GT6D2	GP2M-002	TM-22	Audio Coupling §
C137	.01	400	73561	P488-01	GT4S1	GP2-335-01	TM-11	" " " §
C138	.0047	600	73550	P688-0047	GT6D5	GP2M-005	TM-25	Tone Comp. §
C139	.0015	600	73598	P688-0015	GT6D1	GP2L-0015	TM-21	AF Plate Bypass §
C140	.01	1000	73565	P688-01	GT6S1		TM-11	Audio Coupling §
C141	.0047	600	73550	P688-0047	GT6D5		TM-25	Output Plate Bypass §
C142	22							Fixed Trimmer
C143	47			1469-00005	5R5Q5	NP0M-50	MS-45	" "
C144	47			1469-00005	5R5Q5	NP0M-50	MS-45	" "
C145A	10	300	74200					Pre-Amp. Plate Dec. ♦♦
B	100	10						Pre-Amp. Cath. Bypass ♦♦

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA RCA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C146	150		48125	1468-00015	SWSP15	GP2K-150	1FM-315	Output Screen Bypass ♦♦
C147	.01	400	73561	P488-01	GT4S1	GP2-335-01	TM-11	Tone Comp. ♦♦
C148	.01	400	73561	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling ♦♦

* Some models use 100MMF in this application.
† Not used in all models.
‡ When either item C117 or C118 are replaced, replace both with capacitors of equal value.
§ Used only in table and consolette models.
# Used as output decoupling in table and consolette models only.
** Used as output cathode bypass in table and consolette models only.
†† Some models use two .47MFD capacitors in parallel for C6.
♦ Parallel sections to obtain desired capacity.
♦♦ Used only in models 9TW333.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	50KΩ	‡	72734			Horiz. hold control (Dual concentric)
B	1 Meg.	‡				Vert. hold control
R2A	50KΩ	‡	73156	Q11-123	AM-44-S	Brightness control
B	Shaft		Not Req.	Not Req.	FS-3	Attach to R2A per instructions
R3	10KΩ	‡	73663	Q13-116		Contrast control
R3A	1 Meg.	‡	73910			Volume control, tapped @ 200KΩ, and switch #
B	10KΩ					Contrast control #
R4	200KΩ	‡	73679		M-52-S	AGC threshold control
R5	2.5 Meg	‡	71440	Q11-239		Height control
R6A	220KΩ	5	72735		P-10-2500	Focus control
B	5000Ω	4	74442			Focus control-models 9T240, 9T246, 9TC240 only
R7	500ΩΩ	‡	71441	Q11-114	M-19-S	Vert. linearity control
R8A	1.5Meg.	‡	73662	Q18-139XX	T-95	Volume control, tapped @ 250KΩ and 500KΩ
B	Switch		Not Req.	76-1	SW-A	Attach to R8A per instructions

Dual concentric control - Used in Models 8T241, 8T243, 8T244, 9T240, 9T246, and 9TC240.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED
R9	100Ω	‡			RF Grid
R10	150Ω 20%	‡			AGC Network
R11	2700Ω	‡		BTS-2700	RF Plate Decoupling
R12	150Ω 20%	‡			RF Screen Decoupling
R13	100KΩ 20%	‡			Series Test
R14	100KΩ 20%	‡			Mixer Grid
R15	150Ω 20%	‡			Mixer Decoupling
R16	100Ω	‡			Decoupling Network
R17	100KΩ 20%	‡			Osc. Grid
R18	100KΩ 20%	‡			Osc. Grid
R19	472 20%	‡			Osc. Cathode
R20	10KΩ 20%	‡			Osc. Plate Decoupling
R21	150Ω 20%	‡			Decoupling Network
R22	39Ω	‡			1st Video IF Cathode
R23	1000Ω 20%	‡			1st Video IF Decoupling
R24	1000Ω 20%	‡		BTS-1000	AGC Network
R25	560Ω 5%	‡		BTS-5600-5%	" "
R26	18KΩ 5%	‡		BTS-18K-5%	" "
R27	150Ω 20%	‡			Decoupling Network
R28	10KΩ 5%	‡			2nd Video IF Grid
R29	68Ω	‡			2nd Video IF Cathode
R30	1000Ω 20%	‡			2nd Video IF Decoupling
R31	150Ω 20%	‡			Decoupling Network
R32	82000Ω 5%	‡			3rd Video IF Grid Coil Shunt
R33	39Ω	‡			3rd Video IF Cathode
R34	5600Ω 5%	‡			3rd Video IF Plate
R35	1000Ω 20%	‡		BTS-1000	3rd Video IF Decoupling
R36	150Ω 20%	‡			Decoupling Network
R37	1000Ω 20%	‡		BTS-1000	4th Video IF Screen Decoupling
R38	150Ω	‡			4th Video IF Cathode
R39	68000Ω 5%	1			4th Video IF Plate See Note 5
R40	1000Ω 20%	‡		BTS-1000	4th Video IF Plate Decoupling
R41	560Ω 5%	‡		BTS-5600-5%	Video Amp. Grid
R42	100Ω	‡			Video Amp. Cathode
R43	10Ω	‡			Isolation
R44	18KΩ	2		BT-2-18K	Video Output Cathode See Note 3
R45	220Ω	‡		BW-½-220	Voltage Divider
R46	22000Ω	‡		BTS-2200	Video Amp. Plate
R47	33000Ω	‡		BTS-3300	" " "
R48	220KΩ	‡		BTS-220K	Voltage Divider
R49	5600Ω	1		BTA-5600	Video Output Plate
R50	82000Ω 5%	1		BTA-8200-5%	" " "
R51	2.2 Meg.	‡		BTS-2.2 Meg.	Voltage Divider
R52	2.2 Meg.	‡		BTS-2.2 Meg.	Picture Tube Grid
R53	12KΩ	‡		BTS-12K	Voltage Divider
R54	82Ω	‡			1st Sound IF Cathode
R55	12000Ω	‡			1st Sound IF Decoupling
R56	22KΩ	‡			Limiter Grid
R57	100KΩ 20%	‡			Limiter Plate Decoupling
R58	22KΩ 20%	‡			Limiter Screen Decoupling
R59	47KΩ	‡		BTS-47K	Voltage Divider
R60	100KΩ 5%	‡		BTS-100K-5%	Disc. Diode Load
R61	100KΩ 5%	‡		BTS-100K-5%	Disc. Diode Load
R62	22KΩ 20%	‡		BTS-22K	De-emphasis
R63	1.8 Meg.	‡		BTS-1.8 Meg.	Voltage Divider
R64	8200Ω	‡		BTS-8200	" " "
R65	100KΩ 5%	‡		BTS-100K-5%	" " See Note 7
R66	470KΩ	‡		BTS-470K	" "
R67	560KΩ	‡		BTS-560K	" "
R68	5600Ω	‡		BTS-5600	Isolation
R69	4700Ω	‡		BTS-4700	AGC Rect. Plate
R70	100KΩ	‡		BTS-100K	AGC Rect. Cathode
R71	2700Ω	‡		BTS-2700	" " "
R72	47KΩ	‡		BTS-47K	1st Sync. Sep. Grid See Note 4
R73	27KΩ	‡		BTS-27K	1st Sync. Sep. Plate

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA PART No.	IRC PART No.	IDENTIFICATION CODES
R74	330KΩ	‡		BTS-330K	1st Sync. Sep. Cathode
R75	560Ω	‡		BTS-5600	" " "
R76	47KΩ	‡		BTS-47K	Isolation
R77	10 Meg.	‡		BTS-10 Meg.	Voltage Divider
R78	1 Meg.	‡		BTS-1 Meg.	Sync. Amp. Grid
R79	15KΩ	1		BTA-15K	Sync. Amp. Plate
R80	3.9 Meg.	‡		BTS-3.9 Meg.	2nd Sync. Sep. Grid
R81	6800Ω	‡		BTS-6800	2nd Sync. Sep. Cathode
R82	22KΩ	‡		BTS-22K	Integrator
R83	8200Ω	‡		BTS-8200	"
R84	8200Ω	‡		BTS-8200	"
R85	1.5 Meg.	‡		BTS-1.5 Meg.	Voltage Divider
R86	220KΩ	‡		BTS-220K	" " "
R87	2.2 Meg.	‡		BTS-2.2 Meg.	" " "
R88	100KΩ	‡		BTS-100K	" " "
R89	56KΩ	‡		BTS-56K	Feedback
R90	8200Ω	‡		BTS-8200	Vert. Peaking
R91	2.2 Meg.	‡		BTS-2.2 Meg.	Vert. Output Grid
R92	27000Ω	‡		BTS-2700	Vert. Output Cathode
R93	10000Ω 20%	‡		BTS-1000	Filter
R94	820KΩ 5%	‡		BTS-820K-5%	Horiz. Osc. Control Grid
R95	100KΩ	‡		BTS-100K	Horiz. Osc. Control Cathode
R96	150KΩ 5%	‡		BTA-150K-5%	" " " "
R97	82000Ω	‡		BTS-8200	Horiz. AFC Filter Network
R98	82KΩ	‡		BTS-82K	Voltage Divider See Note 6
R99	150KΩ	‡		BTA-150K	Voltage Divider See Note 7
R100	2.7 Meg. 5%	1		BTA-2.7 Meg-5%	Voltage Divider
R101	100KΩ	1		BTA-100K	Horiz. Osc. Grid
R102	8200Ω 5%	‡		BTS-8200-5%	Horiz. Transformer Shunt
R103	22KΩ	‡		BTS-22K	Horiz. Osc. Transformer Shunt
R104	120KΩ	1		BTA-120K	Voltage Divider
R105	150KΩ	‡		BTS-150K	Horiz. AFC Feedback
R106	10KΩ	‡		BTS-10K	Filter
R107	1 Meg.	‡		BTS-1 Meg.	Horiz. Output Grid
R108	47Ω	1		BW-1-47	Horiz. Output Cathode
R109	39Ω	1		BW-1-39	" " "
R110	68000Ω	1		BTA-6800	Horiz. Output Screen
R111	47Ω 20%	‡			Parasitic Supp.
R112	560KΩ	‡		BTS-560K	Feedback
R113	3.3Ω	1	71513		HV Rect. Filament (Wire Wound)
R114	1 Meg.	1			HV Filter
R115	10Ω	‡		BW-½-10	Horiz. Centering
R116	330Ω	2		BW-2-330	Focus Coil Shunt (Wire Wound) See Note 9
R117A	850Ω	12			Filter (Wire Wound)
B	650Ω	6	73588		Bias Network (Wire Wound)
C	650Ω	6			Bias Network (Wire Wound)
R118	1800Ω	2		BT-2-1800	Voltage Divider
R119	3400Ω	5		AB-3500	Voltage Divider (Wire Wound) See Note 1
R120	10KΩ	10		AB-10K	Filter
R121	2.2 Meg.	‡		BTS-2.2 Meg.	FM Ant. Isolation
R122	2.2 Meg.	‡		BTS-2.2 Meg.	" " "
R123	3.9 Meg.	‡		BTS-3.9 Meg.	Mixer Grid
R124	33KΩ	‡		BTS-33K	Mixer Plate Decoupling
R125	18KΩ	‡		BTS-18K	Osc. Grid
R126	10Ω	‡			Parasitic Supp.
R127	27KΩ	‡		BTA-27K	Osc. Plate Decoupling
R128	2.2 Meg.	‡		BTS-2.2 Meg.	AVC Network
R129	100KΩ	‡		BTS-100K	" "
R130	68Ω	‡		BW-½-68	1st IF Cathode
R131	27KΩ	‡		BTS-27K	1st IF Screen
R132	680Ω	‡		BTS-680	1st IF Decoupling
R133	56KΩ	‡		BTS-56K	Diode Filter
R134	270KΩ	‡		BTS-270K	Diode Load
R135	180Ω	‡		BW-½-120	2nd FM IF Cathode
R136	15KΩ	‡		BTS-15K	2nd FM IF Screen Decoupling
R137	680Ω	‡		BTS-680	2nd FM IF Plate Decoupling
R138	100Ω	‡		BW-½-100	Balancing
R139	15KΩ	‡		BTS-15K	De-emphasis
R140	10KΩ	‡		BTS-10K	AVC Network
R141	3300Ω	‡		BTS-3300	Balancing
R142	1200Ω	‡		BTS-1200	Balancing
R143	39KΩ	‡		BTS-39K	Ratio Det. Diode Load
R144	470KΩ	‡		BTS-470K	AVC Network
R145	330KΩ	‡		BTS-330K	Tone Compensation
R146	100KΩ	‡		BTS-100K	" "
R147	10 Meg.	‡		BTS-10 Meg.	Phase Inv. Grid
R148	82KΩ	‡		BTS-82K	Phase Inv. Plate
R149	15KΩ	‡		BTS-15K	Tone Compensation
R150	27KΩ	‡		BTS-27K	" "
R151	10 Meg.	‡		BTS-10 Meg.	AF Grid
R152	270KΩ	‡		BTS-270K	AF Plate
R153	470KΩ	‡		BTS-470K	Output Grid
R154	8200Ω	‡		BTS-8200	Output Grid
R155	470KΩ	‡		BTS-470K	Output Grid
R156	470Ω	2		BT-2-470	Output Cathode
R157	100Ω	‡			Parasitic Supp. See Notes 2 & 8
R158	22 Meg.	‡		BTS-22 Meg.	Delayed AVC
R159	22000Ω	5	73637	AB-2250	Filter (Wire Wound)
R160	3.9Ω	1	70250	BW-1-3.9	Voltage Dropping (Wire Wound)
R161	82KΩ	‡		BTS-82K	Tone Compensation See Note 2
R162	10 Meg.	‡		BTS-10 Meg.	AF Grid See Note 2
R163	330KΩ	‡		BTS-330K	AF Plate See Note 2
R164	470KΩ	‡		BTS-470K	Output Grid See Note 2
R165	680Ω	1		BTA-680	Output Cathode See Note 2
R166	1800Ω	2		BW-2-1800	Filter See Note 2
R167	5.1Ω	‡	72067	BW-½-4.7	Disc. Filament (Wire Wound)
R168	5600Ω	‡		BTS-5600	Tone Comp. See Note 8
R169	10KΩ	‡		BTS-10K	Pre-Amp Cathode See Note 8
R170	18KΩ	‡		BTS-18K	Tone Comp. See Note 8
R171	22KΩ	‡		BTS-22K	Pre-Amp Decoupling See Note 8

RCA VICTOR MODELS
8T241, 243, 244; 8TV321,B; 8TV323,B;
9T240, 246; 9TC240, 9TW333

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (CONT.)

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RCA PART No.	IRC PART No.	
R172	120K	½		BTS-120K	Pre-Amp Grid See Note 8
R173	220K	½		BTS-220K	Phono Pre-Amp Plate See Note 8

Note 1. Some models use two resistors in parallel.
Note 2. Used in table and consolette models.
Note 3. Some models use 12KΩ resistor in this application.
Note 4. Some models use 150KΩ resistor in this application.
Note 5. Some models use 8200Ω resistor in this application.
Note 6. Some models use 68KΩ resistor in this application.
Note 7. Some models use 120KΩ resistor in this application.
Note 8. Used in model 9TW333 only.
Note 9. Models 9T240, 9T246, 9TC240 used 390Ω in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ 1.9A	770VCT .24ADC	5VAC @ 3A	5VAC @ 2A	73567	P-8152	P-3063	TP-383
		SEC. 4 6.3VAC @ 9A						
T2	117VAC @ .58A	600VCT .069ADC	6.3VAC @ 4.9A		73601	P-6012 †† ##	P-2952 ##	PV-70A

†† Drill new mounting holes.
Add series resistor to reduce plate voltage.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE		REPLACEMENT DATA				NOTES
	PRI.	SEC.	RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
T3	125Ω Tap 90Ω		73576				Hor. Osc. Trans.
T4	165Ω	1310Ω	73569	A-8121 ††	A-3000 ††	TBO-1 ††	Vert. Block Osc. Transformer
T5	341Ω Tap @ 173Ω	SEC. 1 10.8Ω Tap @ .6Ω SEC. 2 0Ω	73570	A-8117		TFB-1	Hor. Output Trans.
T6	575Ω	6.8Ω	73568	A-8115	A-3035	TSO-1	Vert. Output Trans.
T7A	13.5Ω		71420	DY-1			Hor. Deflection Coil
B	65Ω						Vert. Deflection Coil
T8	370Ω		73566				Focus Coil

†† Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE		RATING DC RES.		REPLACEMENT DATA RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
	PRI.	SEC.	PRI.	SEC.					
T9A	12KΩ CT	3.9Ω	600Ω CT	.4Ω	73636	A-3823	A-2936	RO-9	Models 8TV321, 8TV323, 9TW333
B	8500Ω	3.9Ω	345Ω	.4Ω	71419	A-8114	A-2931	RO-13	Table and consolette models only.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA RCA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-102 ††		†† Replace output transformer to match 6-8Ω voice coil.
SP1A	PM	3.9Ω	73635	MOD.P12-S	12A6A	
B	PM	3.9Ω	73993		57A1	Table models only.
	CONE DIA.	V. C. DIA.				
SP2A	12"	1 1/2"				
B	5 x 7"	9/16"				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.240A	48Ω	1.5Henries	73154	C-2326 ‡ ‡	C-2991 ‡‡	TR-4225	‡‡ Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RCA PART No.	MEISSNER PART No.	NOTES
L2A	Ant. Trans.	.5Ω	.2Ω	73578		Includes mounting bracket and socket.
B	Ant. Trans.			73591		Less mounting bracket and socket.
L3	IF Trap	.5Ω		73476		Includes 12MMF capacitor.
L4	IF Trap Shunt	.5Ω		73475		
L5	IF Trap	.5Ω		73476		Includes 12MMF capacitor.
L6	RF Grid	0Ω				Channel 13
L7	RF Grid			73633		Complete with stator, rotor, coils, and segments.
L8	RF Grid	0Ω				Channel 6
L9A	RF Plate Trimmer	0Ω		73446		Smooth bushing, Channel 13, (Includes Trimmer)
B	RF Plate Trimmer	0Ω		74110		Threaded Bushing, Channel 13, (Includes Trimmer)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF) CONT.

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RCA PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L10	RF Plate			73471		Complete with stator, rotor, coils and segments.
L11	RF Plate	0Ω		73460		Channel 6
L12	RF Coupling	0Ω		73462		
L13A	Mixer Grid Trimmer	0Ω		73444		Smooth bushing, Channel 13 (Includes Trimmer)
B	Mixer Grid Trimmer	0Ω		74109		Threaded bushing, Channel 13 (Includes Trimmer)
L14	Mixer Grid			73470		Complete with stator, rotor, coils and segments.
L15	Mixer Grid	0Ω		73874		Channel 6
L16A	Osc. Plate Trimmer	0Ω		73444		Smooth bushing, Channel 13, (Includes Trimmer)
B	Osc. Plate Trimmer	0Ω		74109		Threaded bushing, Channel 13, (Includes Trimmer)
L17	Osc. Plate			73468		Complete with stator, rotor, coils and segments. Front section.
L18	Osc. Plate			73469		Complete with stator, rotor, coils and segments. Rear section.
L19	Osc. Plate	0Ω		73874		Channel 6
L20A	Osc. Plate Trimmer	0Ω		73443		Smooth bushing, Channel 13, (Includes Trimmer)
B	Osc. Plate Trimmer	0Ω		74108		Threaded bushing, Channel 13 (Includes Trimmer)
L21	Fil. Choke	0Ω		73477		
L22	Fil. Choke	0Ω		73477		
L23	Fil. Choke	0Ω		73477		
L24	Conv. Trans	.5Ω	0Ω	73448		
L25	1st Video IF Trans.	.1Ω	0Ω	73571		Includes 22KΩ resistor and C142
L26	2nd Video IF Trans.	.1Ω		73572		Includes C143
L27	3rd Video IF Trans. and Sound Take-Off	.1Ω		73573		Includes C144
L28	Peaking	2.3Ω		74170		Includes R32
L29	4th Video IF Trans.	.1Ω	0Ω	73574		Includes 36MMF capacitor
L30	Sound Trap	0Ω		71778		Includes 75MMF capacitor
L31	5th Video IF Trans.	.1Ω	0Ω	73575		Includes 56MMF capacitor and 8.2MMF capacitor.
L32	Peaking	4.1Ω		72619		Wound on 10KΩ resistor.
L33	Peaking	6Ω		71528		Wound on 39KΩ resistor
L34	4.5MC Trap	2.5Ω		73577		Includes Capacitor C51
L35	Peaking	7.2Ω		71526		
L36	Peaking	6Ω		71528		Wound on 39KΩ resistor
L37	Peaking	6.2Ω		71526		
L38	Fil. Choke	0Ω		73477		
L39	Sound IF Trans.	0Ω	0Ω	71424		Includes 10MMF and 33MMF capacitor
L40	Disc.Trans.	0Ω	0Ω	71427		Includes 56MMF, 56MMF, and 47MMF capacitor.
L41	Width Cont.	.2Ω		71429		
L42	Hor. Linearity	34Ω		71449		
L43	FM Ant.	0Ω		73918		
L44	AM Ant.	26Ω	2Ω	73661		
L45	FM Osc.	0Ω		73916		
L46	AM Osc.	6.5Ω	1Ω	73744		Pickup coil resistance 2Ω
L47	FM-AM 1st IF Trans.	FM.3Ω AM 8Ω	.3Ω 8Ω	73745		Tapped at 1.3Ω
L48	FM-AM 2nd IF Trans.	FM.8Ω AM 8Ω	.8Ω 8Ω	74019		
L49	Ratio Det. Trans.	.9Ω	.3Ω	73743		
L50	Fil. Choke					Not used in all models.

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA RCA PART No.		NOTES
M1	Bayonet	6-8V	.2A	White	11765		Type #51
M2	Bayonet	6-8V	.2A	White	11765		Type #51
M3	Bayonet	6-8V	.2A	White	11765		Type #51
M4	Bayonet	6-8V	.2A	White	11765		Type #51

MISCELLANEOUS

ITEM No.	PART NAME	RCA PART No.	NOTES
M5	Ion Trap	73301	Permanent, magnet
M6	Fuse	73600	Type AGC .25A
M7A	Band Switch	73669	Models 8TV321, 8TV323
B	Band Switch	74174	Models 8TV321B, 8TV323B(With Aux. Phono Position)
C	Band Switch	74215	Model 9TW333
D	TV-Phono Switch	46760	Model 9T240, 9TC240, 9T246
M8	Tone Switch	73602	Model 9TW333
M9	Tuning Cap.	73607	(17-519MMF, 20-197MMF W/T)
M10	RF Tuner	KRK5	
	Cabinet Back	73643	Models 8T241, 8T243, 8T244
	Cabinet Back	73641	TV chassis model 8TV321, 8TV323
	Cabinet Back	73739	Bottom back cover model 8TV323, 9TW333
	Cabinet Back	73641	Model 9T240
	Cabinet Back	74420	Model 9T240K, 9TC240
	Safety Glass	73779	Models 8TV321, 9TW333
	Safety Glass	73772	Model 8TV323
	Safety Glass	73863	Models 8T243, 8T244
	Safety Glass	74005	Model 8T241
	Safety Glass	74456	Models 9T240, 9TC240

HORIZONTAL OSILLATOR ADJUSTMENTS

HORIZONTAL FREQUENCY ADJUSTMENT

Connect a jumper across terminals "C" and "D" of the horizontal oscillator transformer T3. Tune in a station and, if possible, sync the picture and proceed as follows:

1. Turn horizontal hold control fully clockwise. Adjust the Frequency Adjustment (B1) so picture is just out of sync and the horizontal blanking appears as a vertical bar.

2. Turn the hold control approximately a quarter of a turn from the fully clockwise position and notice the picture width and linearity. If the width and linearity is incorrect, adjust the horizontal drive (B2), width (B3) and horizontal linearity (B4) controls until the picture is correct. If B2, B3, or B4 required adjustment repeat step 1 above.

HORIZONTAL LOCKING RANGE ADJUSTMENT

Turn the horizontal hold control fully counterclockwise. Remove signal momentarily by turning channel switch to another channel and back again. Slowly turn the hold control clockwise and note the number of diagonal bars that appear just before the picture "syncs".

If more than 9 bars are present just before synchronization, turn the horizontal locking range trimmer (B5) slightly clockwise. If less than 7 bars are present, turn B5 slightly counterclockwise.

Turn the hold control counterclockwise and momentarily interrupt the signal and check the number of bars present at the pull-in point. Repeat this procedure until 7 to 9 bars are present.

HORIZONTAL OSCILLATOR WAVEFORM ADJUSTMENT

Remove the jumper across terminals "C" and "D" of T3. Turn the horizontal hold control fully counterclockwise. Adjust B6 with a non-metallic screwdriver until the horizontal blanking bar is present on the raster.

Connect the low capacity probe of an oscilloscope to terminal "C" of T3. Turn the horizontal hold control one quarter of a turn from the clockwise position until the picture syncs. The pattern on the scope should be similar to Fig 8. Adjust B6 until the broad and narrow peaks are of the same amplitude (If necessary, while making this adjustment turn the hold control to keep the picture in synchronization).

This adjustment must be carefully made to assure correct circuit operation. If the broad peak is lower in amplitude than the sharp peak, the oscillator drift becomes greater and the circuit has greater susceptibility to noise pluses. However, if the broad peak is greater in amplitude than the sharp peak, the oscillator is overstabilized, the pull-in range inadequate, and there is the possibility of double triggering of the oscillator as the horizontal hold control approaches the extreme clockwise position.

HORIZONTAL OSCILLATOR ADJUSTMENTS CHECK

Turn the horizontal hold control fully counterclockwise. Momentarily remove the signal and then slowly turn the hold control clockwise and note the number of bars present just before the picture synchronizes.

If more than 3 bars are present, turn B5 slightly clockwise. If less than 3 bars are present, turn B5 slightly counterclockwise. Momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 3 bars are present just before synchronization occurs.

Turn the horizontal hold control fully clockwise. The picture should be just out of synchronization to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Retouch B6 until this condition exists.

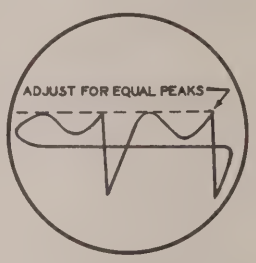
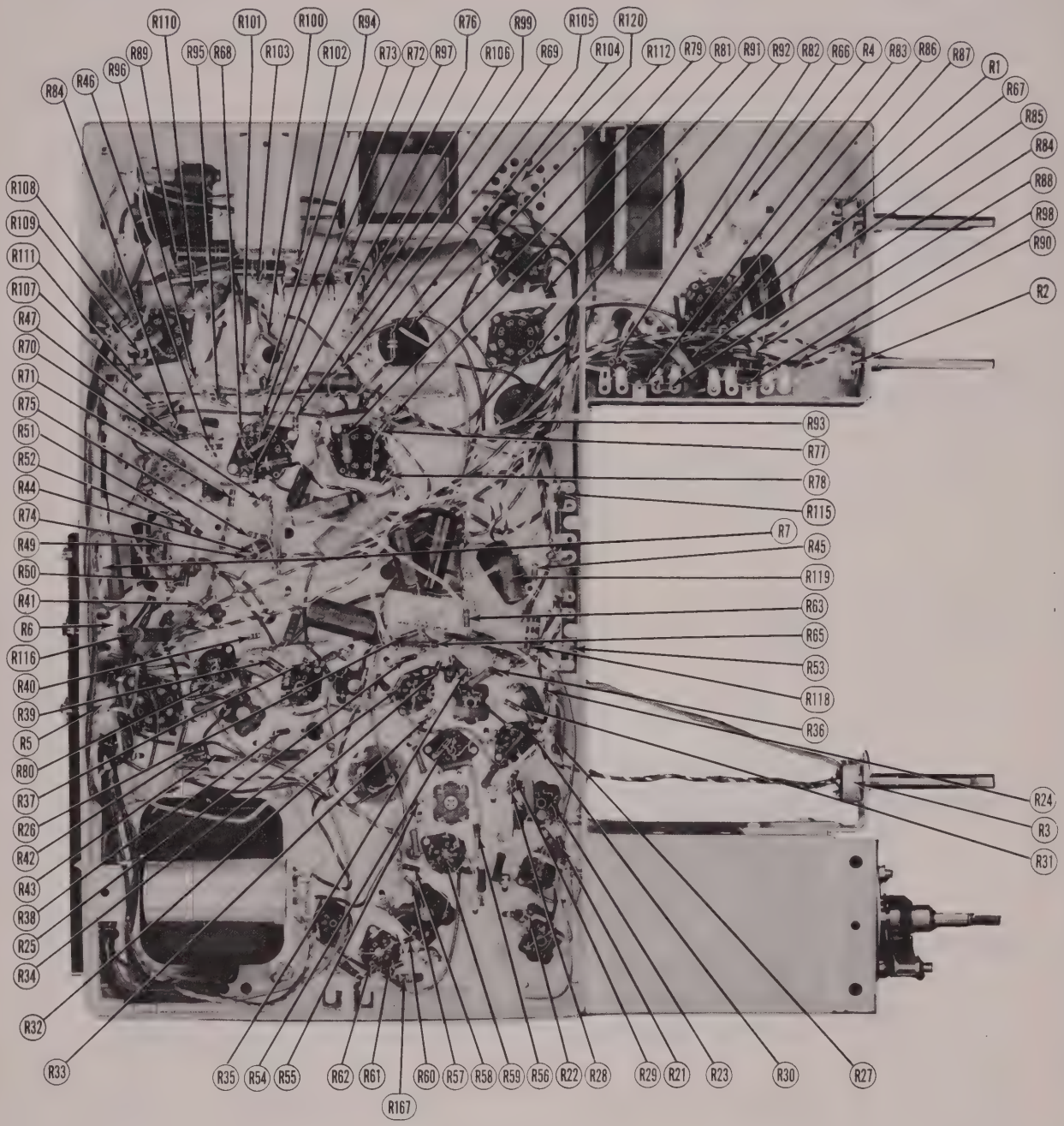


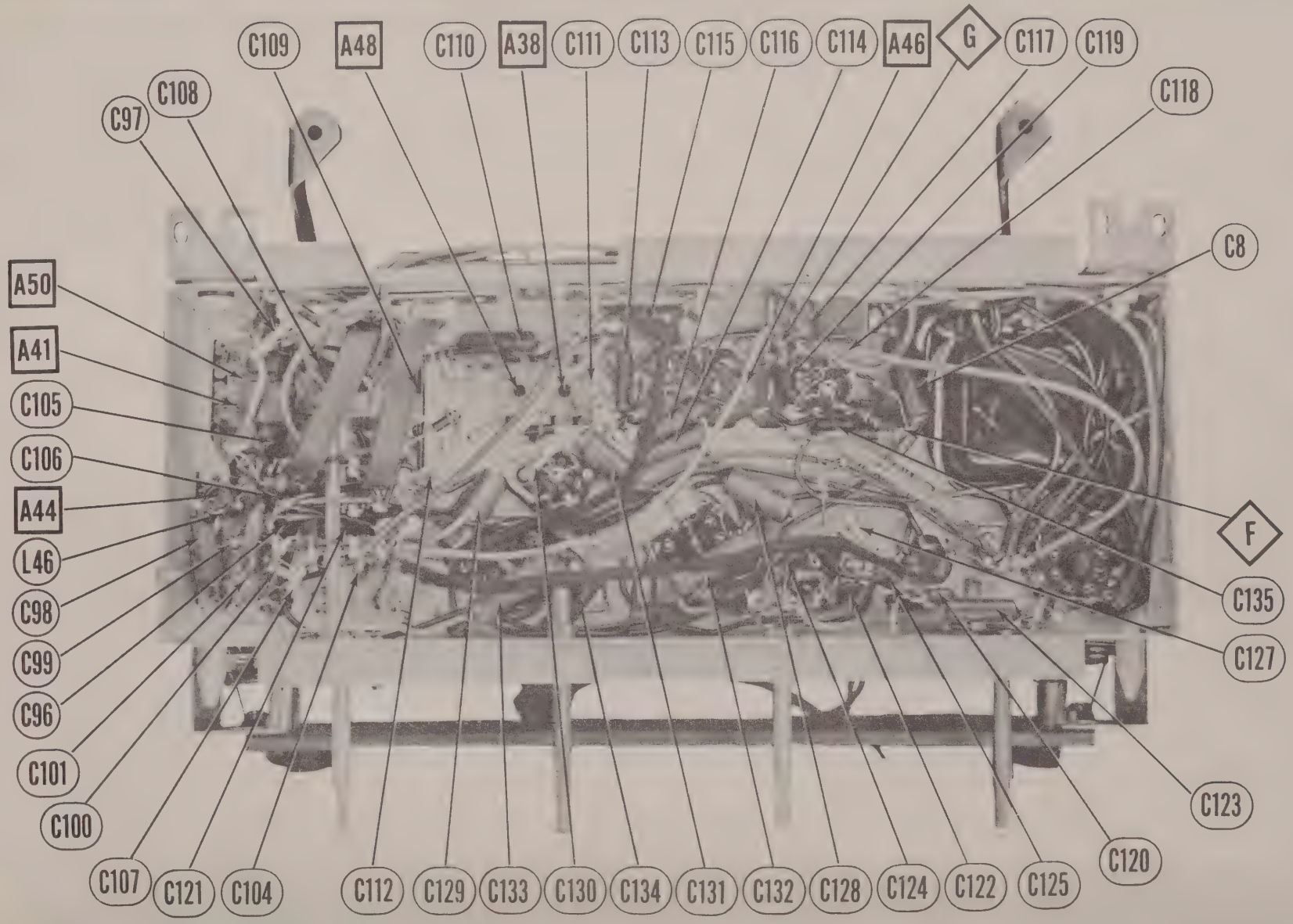
FIG. 8



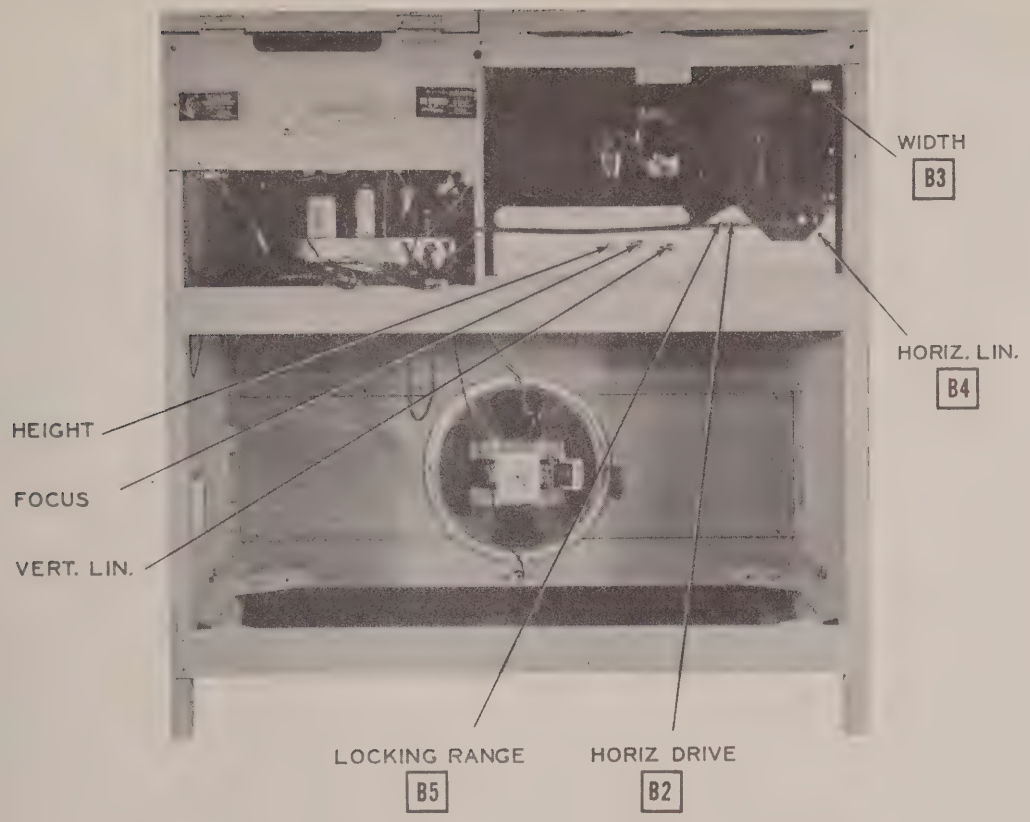
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

RCA VICTOR MODELS
8T241, 243, 244; 8TV321,B; 8TV323,B; 9T240, 246; 9TC240, 9TW333

TUBE PLACEMENT CHART



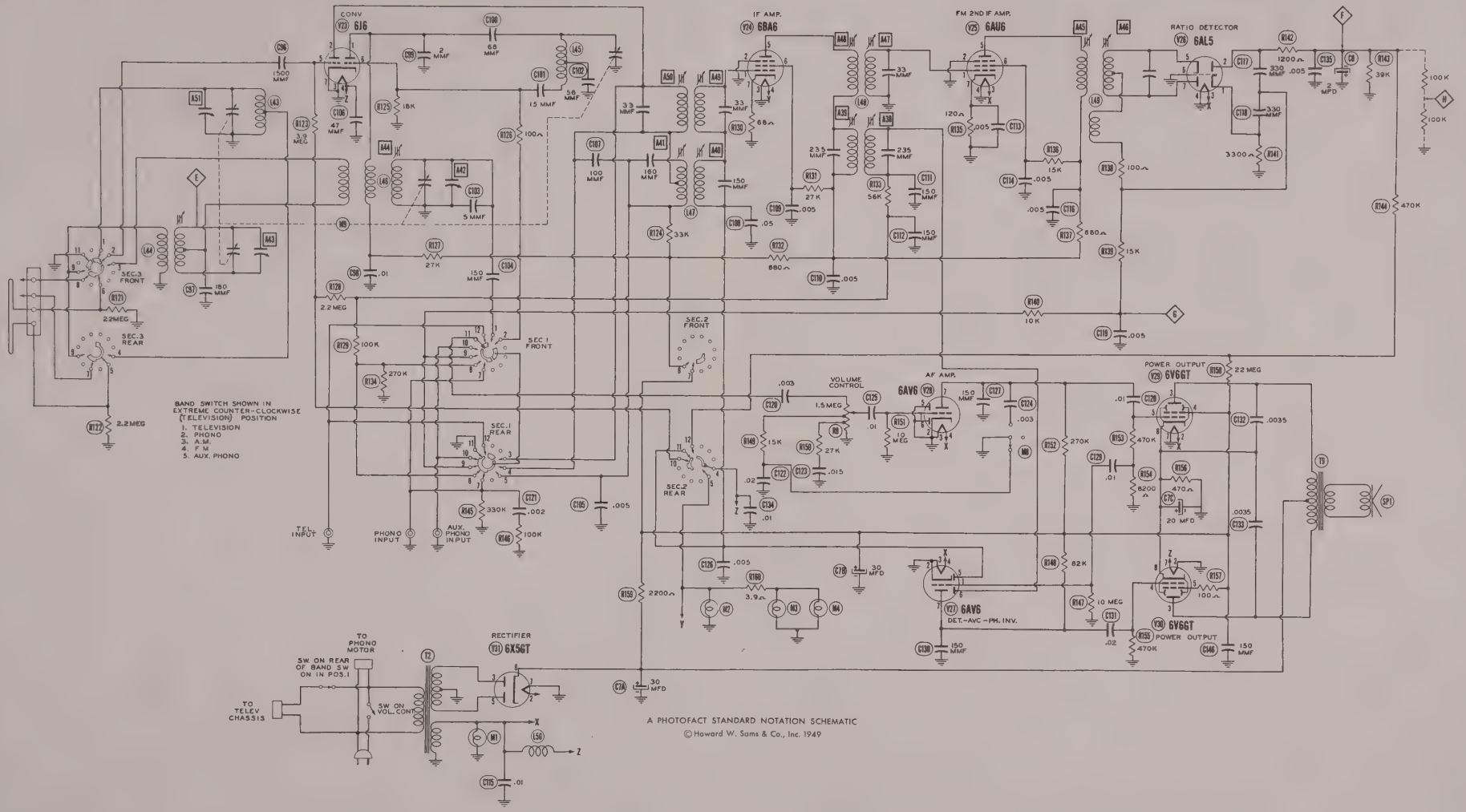
RADIO CHASSIS-CAPACITOR IDENTIFICATION

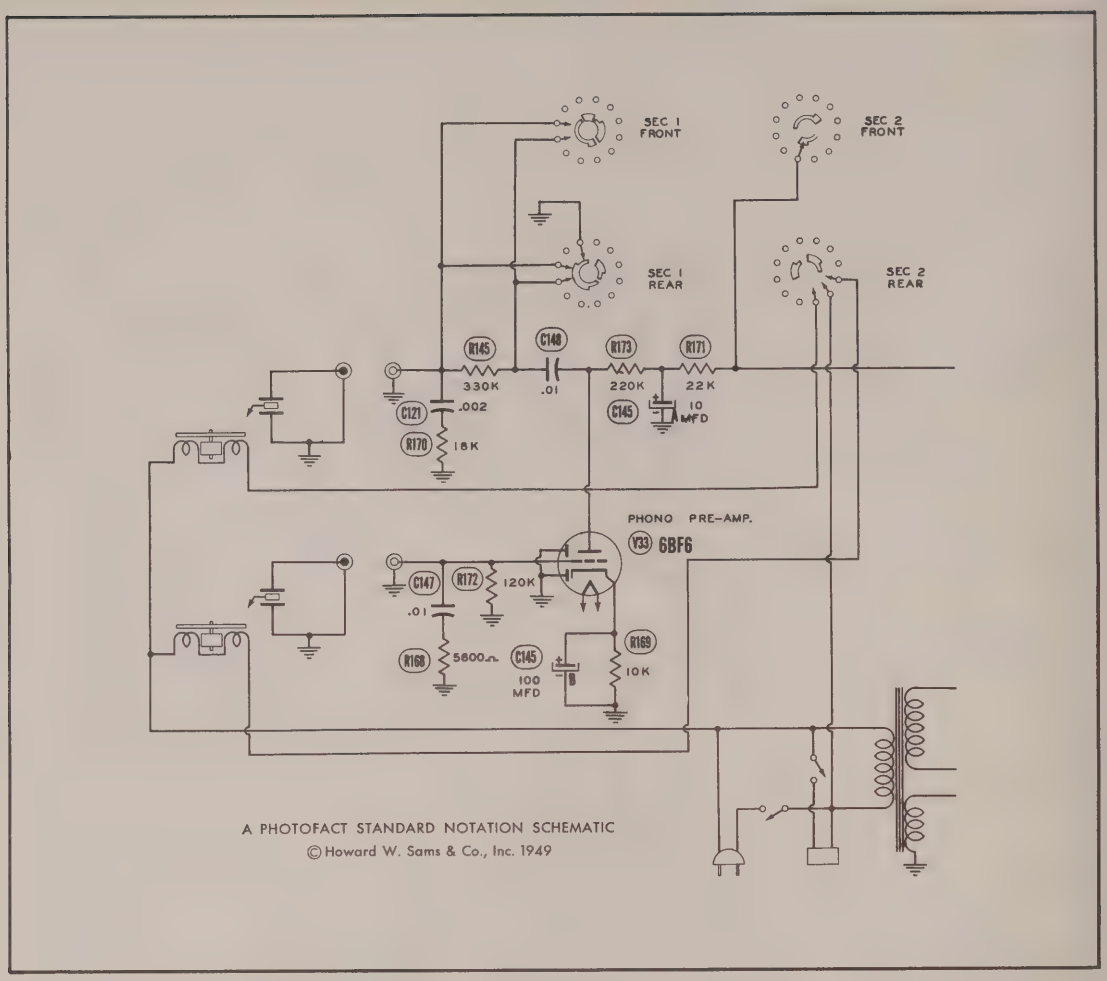


CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS-MODEL 8TV321

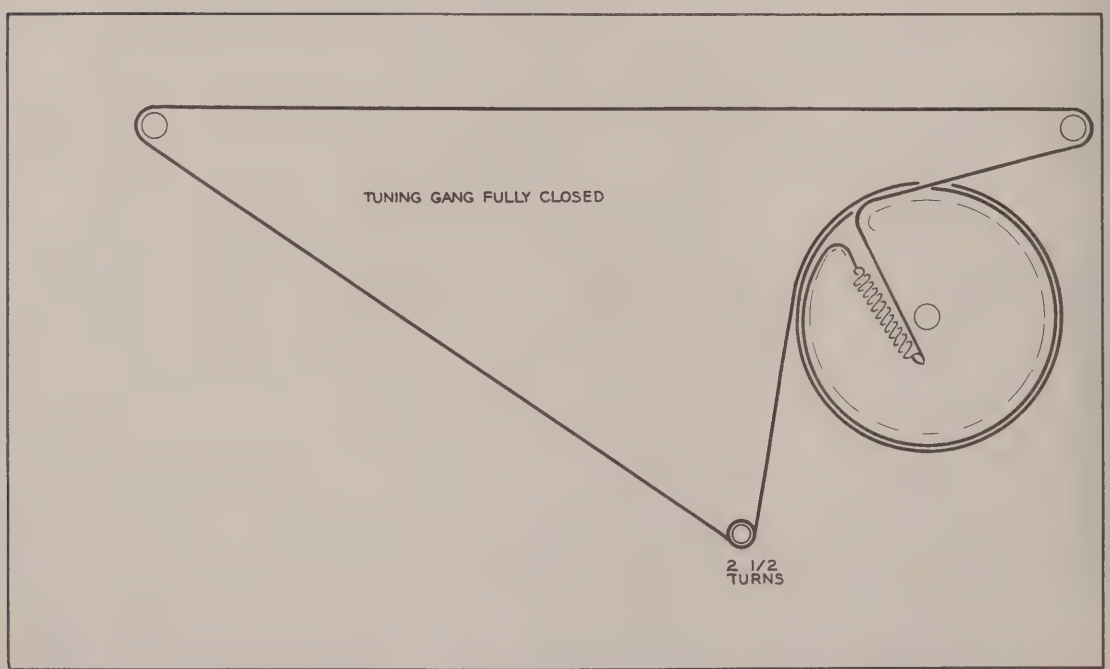
1. Remove four push-on type knobs from TV controls.
2. Remove four push-on type knobs from receiver controls.
3. Remove five 3/8" hex bolts holding TV chassis to support board.
4. Remove TV audio plug from rear of receiver chassis. Feed back to TV section.
5. Remove TV power plug from rear of receiver chassis.
6. Remove TV antenna plug from rear of receiver chassis. Feed back to TV section.
7. Remove TV chassis.
8. Remove panel lamp from inside the record changer compartment. Feed back to receiver section.
9. Remove panel lamp from inside bottom from of cabinet.
10. Remove speaker plug from speaker.
11. Remove antenna plug from rear of receiver chassis.
12. Remove phono audio plug from rear of receiver chassis.
13. Disconnect phono motor power plug.
14. Remove two screws holding braces to receiver mounting board.
15. Remove four 1/4" hex nuts from rear corners of receiver mounting board.
16. Slide receiver chassis out.
17. Remove four 5/16" hex nuts holding speaker. Remove speaker.


CONV
V23 6J6
IF AMP.
V24 6BA6
FM 2ND IF AMP.
V25 6AU6
RATIO DETECTOR
V26 6AL5
AF AMP.
6AV6 V28
VOLUME CONTROL
1.5 MEG
POWER OUTPUT
V29 6V6GT
V30 6V6GT
POWER OUTPUT
RECTIFIER
V31 6X5GT
V27 6AV6
DET.-AVC-PH. INV.
SEC.3 FRONT
SEC.3 REAR
SEC.1 FRONT
SEC.1 REAR
SEC.2 FRONT
SEC.2 REAR
BAND SWITCH SHOWN IN EXTREME COUNTER-CLOCKWISE (TELEVISION) POSITION
1. TELEVISION
2. PHONO
3. A.M.
4. F.M.
5. AUX. PHONO
TEL. INPUT
PHONO INPUT
AUX. PHONO INPUT
TO PHONO MOTOR
SW. ON REAR OF BAND SW. ON IN POS. 1
SW. ON VOL. CONT.
TO TELEV. CHASSIS
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1949



PHONO PRE-AMP SCHEMATIC-MODEL 9TW333

DIAL CORD STRINGING



RADIO CHASSIS-RESISTOR IDENTIFICATION

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-.6VDC	0V	0V	6.3VAC	100VDC	110VDC	0V		
V 2	6AG5	-1.9VDC	0V	0V	6.3VAC	110VDC	110VDC	0V		
V 3	6J6	40VDC	40VDC	6.3VAC	0V	§-1VDC	§-.6VDC	.1VDC		
V 4	6AG5	-1.3VDC	.1VDC	0V	6.3VAC	105VDC	105VDC	.1VDC		
V 5	6AG5	0V	.6VDC	6.3VAC	0V	105VDC	105VDC	.6VDC		
V 6	6AG5	-1.5VDC	.1VDC	0V	6.3VAC	90VDC	120VDC	.1VDC		
V 7	6AG5	0V	1.3VDC	6.3VAC	0V	145VDC	125VDC	1.3VDC		
V 8	6AL5	♦0V	☁20VDC	0V	6.3VAC	☁0V	0V	♦-3VDC		
V 9	12AU7	♦90VDC	♦-1.8VDC	♦5VDC	6.3VAC	6.3VAC	♦260VDC	♦100VDC	♦105VDC	0V
V 10	6AU6	0V	0V	0V	6.3VAC	110VDC	110VDC	.7VDC		
V 11	6AU6	-.5VDC	0V	0V	6.3VAC	125VDC	70VDC	0V		
V 12	6AL5	0V	-3.2VDC	1.2VAC	6.3VAC	-5.5VDC	0V	-.5VDC		
V 13	6AV6	0V	0V	0V	6.3VAC	-.1VDC	-.1VDC	0V		
V 14	6SN7GT	♦-4.2VDC	♦95VDC ♦340VDC	♦0V	☁2.5VDC ☁7.2VDC	45VDC	☁0V	6.3VAC	0V	
V 15	6SN7GT	☁31VDC	☁135VDC	☁45VDC	-18VDC	80VDC	-4VDC	6.3VAC	0V	
V 16	6SN7GT	-1.4VDC	140VDC	0V	☁17VDC	☁270VDC	☁1.1VDC	6.3VAC	0V	
V 17	6K6GT	♦0V	0V	♦320VDC	♦320VDC	♦0V	♦30VDC	6.3VAC	♦30VDC ♦40VDC	
V 18	6SN7GT	♦-1.2VDC	♦105VDC	♦-11VDC	♦-40VDC	♦165VDC	♦0V	6.3VAC	0V	
V 19	6BG6G	♦0V	0V	♦8VDC	♦0V	♦8VDC	♦110VDC	6.3VAC	♦260VDC	TOP CAP *
V 20	5V4G	0V	320VDC	0V	260VDC	0V	260VDC	0V	320VDC	
V 21	1B3GT	* DO NOT MEASURE								
V 22	5U4G	0V	275VDC	0V	390VAC	0V	390VAC	0V	275VDC	
V23A	6J6	115VDC	115VDC	0V	6.3VAC	-3.4VDC	§-5.9VDC	0V		
‡ V23B	6J6	75VDC	150VDC	0V	6.3VAC	-1.5VDC	§-2.5VDC	0V		
V24	6BA6	-.5VDC	0V	0V	6.3VAC	230VDC	120VDC	.8VDC		
‡ V25	6AU6	0V	0V	6.3VAC	0V	225VDC	120VDC	1.4VDC		
‡ V26	6AL5	.3VDC	-3VDC	6.3VAC	0V	-1.5VDC	0V	-.5VDC		
V27	6AV6	0V	0V	0V	6.3VAC	-.3VDC	-.3VDC	145VDC		
V28	6AV6	-.5VDC	0V	0V	6.3VAC	0V	0V	95VDC		
V29	6V6GT	0V	6.3VAC	320VDC	320VDC	0V	0V	0V	17VDC	
V30	6V6GT	0V	6.3VAC	320VDC	320VDC	0V	0V	0V	17VDC	
V31	6X5GT	0V	6.3VAC	300VAC	0V	300VAC	0V	0V	320VDC	
V32	10BP4	0V	♦105VDC	PIN 10 310VDC	PIN 11 95VDC	PIN 12 6.3VAC				

♦ Taken in FM position.
♦ Measured from pin 6 of V18
☁ Measured from pin 5 of V8
* Do not measure
§ Taken with vacuum tube voltmeter.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	120KΩ	0Ω	0Ω	.1Ω	↑4KΩ	↑1.5KΩ	0Ω		
V 2	6AG5	100KΩ	0Ω	0Ω	.1Ω	↑2.5KΩ	↑2.5KΩ	0Ω		
V 3	6J6	↑13KΩ	↑13KΩ	.1Ω	0Ω	100KΩ	100KΩ	47Ω		
V 4	6AG5	6.5KΩ	39Ω	0Ω	.1Ω	↑2.5KΩ	↑2.5KΩ	39Ω		
V 5	6AG5	10KΩ	68Ω	.1Ω	0Ω	↑2.5KΩ	↑2.5KΩ	68Ω		
V 6	6AG5	5.5KΩ	39Ω	0Ω	.1Ω	↑8KΩ	↑2.5KΩ	39Ω		
V 7	6AG5	0Ω	150Ω	.1Ω	0Ω	↑8.5KΩ	↑2.5KΩ	150Ω		
V 8	6AL5	♦10Ω	♦4 Meg.	0Ω	.1Ω	♦650Ω	0Ω	♦6KΩ		
V 9	12AU7	5.5KΩ	♦6KΩ	♦100Ω	.1Ω	.1Ω	↑14KΩ	3.5KΩ	♦7KΩ	0Ω
V 10	6AU6	0Ω	0Ω	0Ω	.1Ω	↑2.5KΩ	↑2.5KΩ	82Ω		
V 11	6AU6	22KΩ	0Ω	0Ω	.1Ω	↑2.5KΩ	↑18KΩ	0Ω		
V 12	6AL5	0Ω	100KΩ	2Ω	.1Ω	200KΩ	0Ω	100KΩ		
V 13	6AV6	Inf.	0Ω	0Ω	.1Ω	120KΩ	120KΩ	Inf.		
V 14	6SN7GT	3.8 Meg.	♦1.4Meg. ♦280KΩ	♦0Ω	♦370KΩ ♦340KΩ	23KΩ	♦570Ω	.1Ω	0Ω	
V 15	6SN7GT	60KΩ	↑30KΩ	330KΩ	11KΩ	↑7KΩ	100KΩ	.1Ω	0Ω	
V 16	6SN7GT	1 Meg.	↑15KΩ	0Ω	♦4 Meg.	↑360Ω	♦7.5KΩ	.1Ω	0Ω	
V 17	6K6GT	Inf.	0Ω	↑2KΩ	↑2KΩ	♦2.2Meg.	7KΩ	.1Ω	♦8.5KΩ ♦2.5KΩ	
V 18	6SN7GT	♦1 Meg.	♦180KΩ	♦300KΩ	♦250KΩ	♦130KΩ	♦0Ω	.1Ω	0Ω	
V 19	6BG6G	Inf.	0Ω	♦85Ω	Inf.	♦1 Meg.	♦85Ω	.1Ω	↑7KΩ	TOP CAP ♦200Ω
V 20	5V4G	Inf.	200KΩ	Inf.	20KΩ	Inf.	20KΩ	Inf.	200KΩ	
V 21	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ♦470Ω
V 22	5U4G	Inf.	5KΩ	Inf.	1.1KΩ	Inf.	1.1KΩ	Inf.	5KΩ	
V23A	6J6	▲30KΩ	▲36KΩ	0Ω	.1Ω	6.5Meg.	18KΩ	0Ω		
‡ V23B	6J6	▲30KΩ	▲36KΩ	0Ω	.1Ω	6.5Meg.	18KΩ	0Ω		
V24	6BA6	3 Meg.	0Ω	0Ω	.1Ω	▲3KΩ	▲30KΩ	68Ω		
‡ V25	6AU6	.8Ω	0Ω	.1Ω	0Ω	▲3.5KΩ	▲18KΩ	120Ω		
‡ V26	6AL5	3.3KΩ	40KΩ	.1Ω	0Ω	Inf.	0Ω	Inf.		
V27	6AV6	10 Meg.	0Ω	0Ω	.1Ω	2.5 Meg.	160KΩ	▲85KΩ		
V28	6AV6	10 Meg.	0Ω	0Ω	.1Ω	0Ω	0Ω	▲270KΩ		
V29	6V6GT	0Ω	.1Ω	▲300Ω	▲2.2KΩ	480KΩ	8.5KΩ	0Ω	470Ω	
V30	6V6GT	0Ω	.1Ω	▲270Ω	▲2.3KΩ	470KΩ	1.5Ω	0Ω	470Ω	
V31	6X5GT	0Ω	.1Ω	170Ω	0Ω	180Ω	Inf.	0Ω	70KΩ	
V32	10BP4	0Ω	♦2.2Meg.	PIN 10 ♦56KΩ	PIN 11 40KΩ	PIN 12 .1Ω				

‡ Taken in FM position.
↑ Measured from pin 8 of V22
♦ Measured from pin 6 of V18
♦ Measured from pin 8 of V20
▲ Measured from pin 8 of V31

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TELE-TONE MODEL
201 (Ch. Series AX)

TELE-TONE MODEL
201 (Ch. Series AX)

TELE-TONE MODEL 201

TRADE NAME	Tele-Tone Model 201 (Ch. Series AX)
MANUFACTURER	Tele-Tone Radio Co., 540 W. 58th St., New York 19, New York
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types 12BA6 RF Amp., 12BE6 Converter, 12BA6 IF Amp., 12AT6 DET.-AVC-AF, 35C5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC RATING: .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning gang fully closed and set pointer to last calibration mark on left hand end of dial backplate.

Use isolation transformer if available. If not connect a .1MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to stator of RF section of tuning gang. Low side to B-.	455KC (400~ Mod.)	Tuning gang fully closed	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC (400~ Mod.)	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC (400~ Mod.)	Tune for max. output.	"	A6	Adjust for maximum output.
4.		Loop	600KC	Second calibration mark from left hand end of dial back plate.	"		Bend end rotor plates of oscillator section of tuning gang for maximum output. Repeat steps 2 and 4 alternately for optimum results.

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DATE 10/49 SET #74 FOLDER #9

PARTS LIST AND DESCRIPTIONS

TELE-TONE MODEL 201

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TELE-TONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amp.	12BA6	12BA6	7BK	
V4	DET.-AVC-AF	12AT6	12AT6	7BT	
V5	Power Output	35C5	35C5	7CV	
V6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TELE-TONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	25	150	CE-21	PRSA150/50-30	EDL-5315		TA-530	Filter Green
B	50	150		PRS150/24	BR3015		UT-301	Filter Blue
C	25	150						Filter Red
C2	.05	400	CP-503-1	P488-05	GT4S5		TM-15	AVC Filter
C3	100	500	CM-101-1	1468-0001	5W5T1	GP1K-100	1FM-31	RF Coupling
C4	.05	400	CP-503-1	P488-05	GT4S5		72P51	Line Isolation
C5	100	500	CM-101-1	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C6	100	500	CM-101-1	1468-0001	5W5T1	GP1K-100	1FM-31	RF Bypass
C7	.002	400	CP-202-2	P688-002	GT6D2	GP2M-002	TM-22	Audio Coupling
C8	.01	400	CP-103-1	P488-01	GT4S1	GP2-335-01	TM-11	" "
C9	.02	400	CP-203-1	P488-02	GT4S2		TM-12	Output Plate Bypass
C10	.02	400	CP-203-1	P488-02	GT4S2		TM-12	Rect. Bypass

CONTROLS

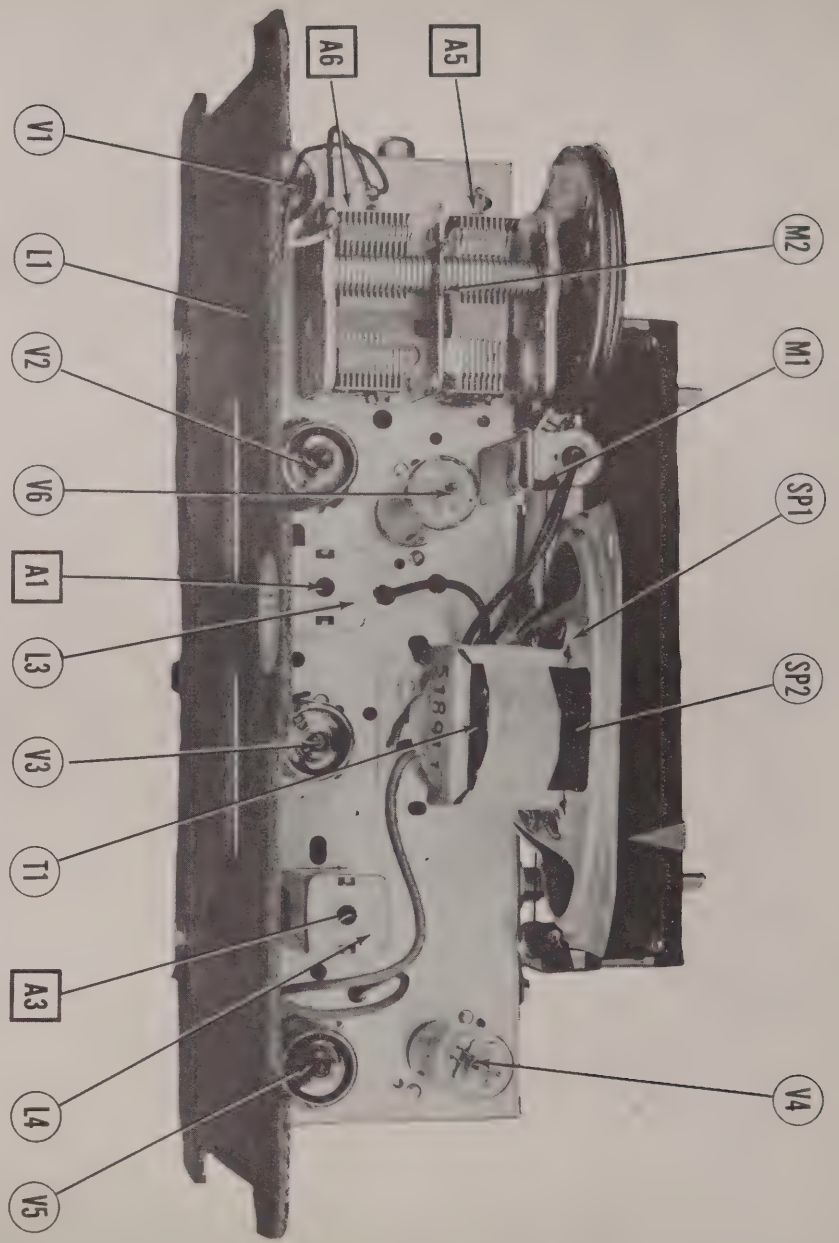
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELE-TONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	VC-8	Q13-137 *	M-63-Z *	Volume control
B	Switch			76-1	SW-A	Attach to R1A per instructions

* Install a 100KΩ resistor in series with the right hand terminal of the new control and the lead connecting to the same terminal of the original control. (control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELE-TONE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	180Ω	½	RC-181-2	BW-½-180	RF Cathode
R3	4700Ω	½	RC-472-2	BTS-4700	RF Plate
R4	47KΩ	½	RC-473-2	BTS-47K	Converter Grid
R5	22KΩ	½	RC-223-1	BTS-22K	Osc. Grid
R6	270Ω	½	RC-271-2	BW-½-270	IF Cathode
R7	2.2 Meg.	½	RC-225-1	BTS-2.2 Meg.	AVC Network
R8	10 Meg.	½	RC-106-1	BTS-10 Meg.	AF Grid
R9	270KΩ	½	RC-274-2	BTS-270K	AF Plate
R10	470KΩ	½	RC-474-1	BTS-470K	Output Grid
R11	180Ω	½	RC-181-2	BW-½-180	Output Cathode
R12	1200Ω	1	RC-122-5	BW-1-1200	Filter
R13	150Ω	1	RC-151-5	BW-1-150	Filter (Wire Wound)
R14	18Ω	½	RC-180-2		Rect. Ballast

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TELE-TONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	3500Ω	3.2Ω	210Ω	.5Ω	TR-16	A-3332	A-3025	RO-1A	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TELE-TONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-113♯†		† Remount output transformer.
SP1	PM	3.2Ω	SP-48-16	MOD.P4-X	4A07†	♯ Fabricate mounting bracket.
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TELE-TONE PART No.	MEISSNER PART No.	
L1	Loop Ant.		4Ω	LP-17		
L2	Osc. Coil	.5Ω	6.5Ω	LC-9	14-1060 $	$ Add 50MMF from high side of tuning cap to Osc. Grid.
L3	Input IF	23Ω	23Ω	LF-29	16-6678	
L4	Output IF	23Ω	23Ω	LF-29	16-6678	

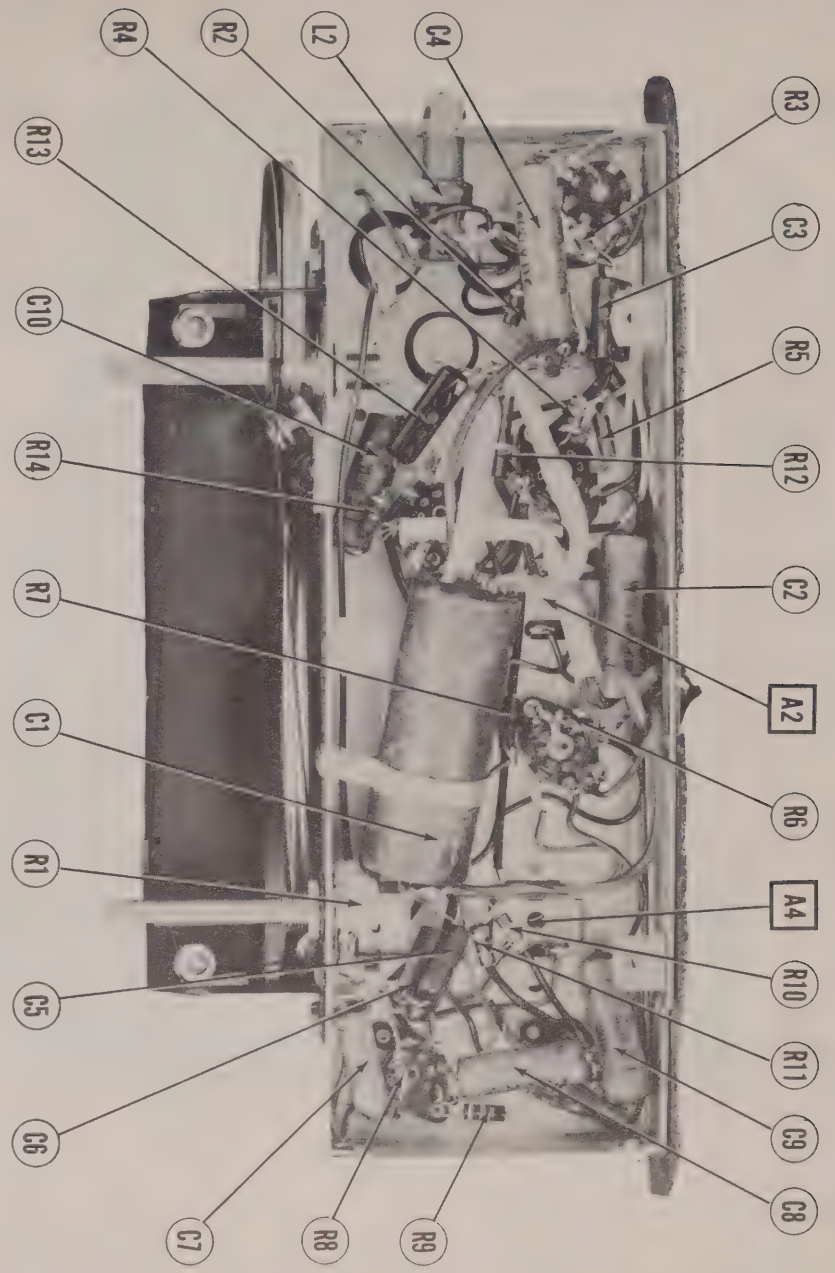
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					TELE-TONE PART No.		
M1	Bayonet	6-8	.15	Brown	BU47		Type #47

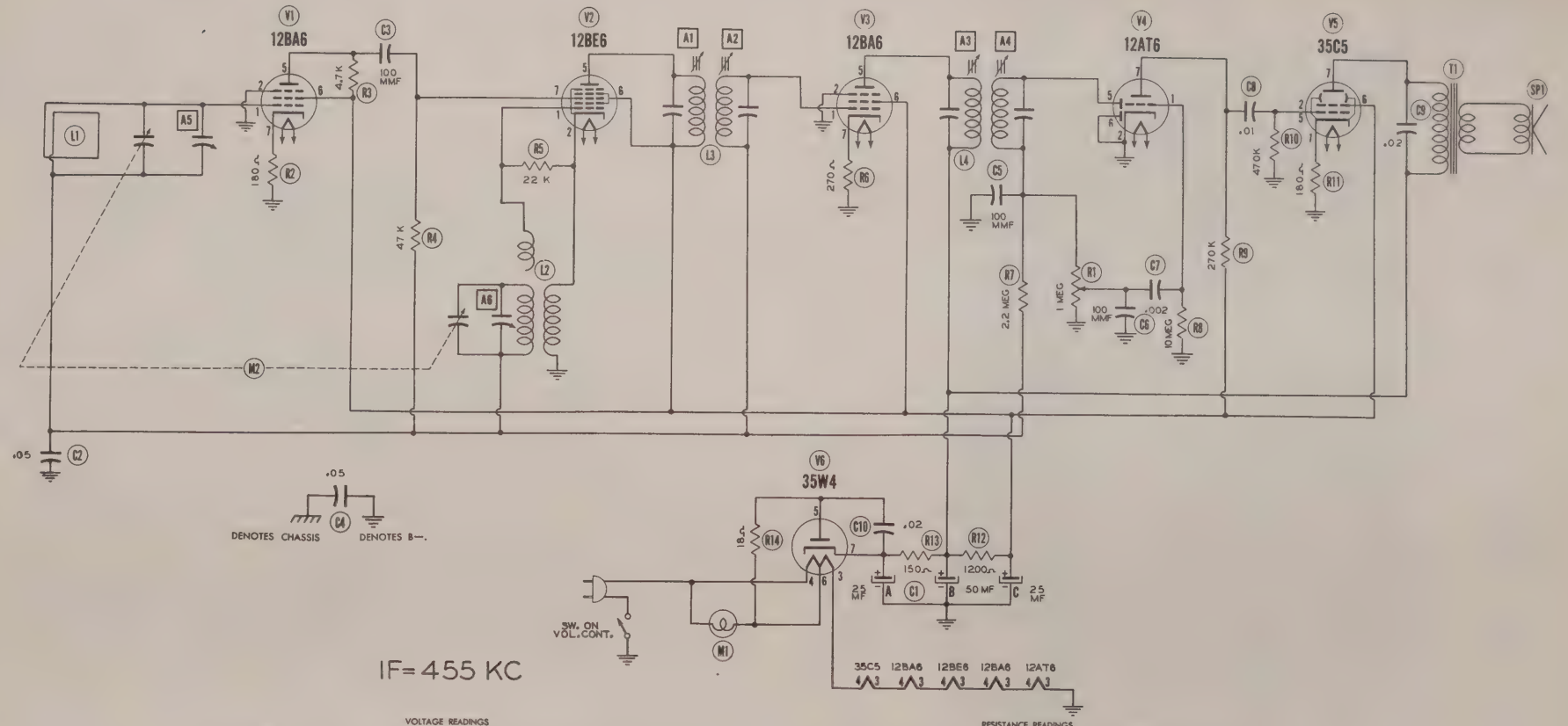
MISCELLANEOUS

ITEM No.	PART NAME	TELE-TONE PART No.	NOTES
M2	2 Gang. Var. Cap.	CV-15	(28-392MMF, 31-175MMF)

CHASSIS—TOP VIEW



TELE-TONE MODEL 201



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	-1.2VDC	0V	12VAC	24VAC	65VDC	90VDC	1VDC
V 2	12BE6	§-5.8VDC	0V	24VAC	36VAC	85VDC	90VDC	-1.2VDC
V 3	12BA6	-1.2VDC	0V	36VAC	50VAC	108VDC	90VDC	1VDC
V 4	12AT6	-2.3VDC	0V	0V	12VAC	-2.0VDC	0V	43VDC
V 5	35C5	5.8VDC	0V	50VAC	85VAC	0V	90VDC	103VDC
V 6	35W4	0V	0V	85VAC	117VAC	110VAC	105VAC	118VDC

§ Taken With Vacuum Tube Voltmeter.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	3.5 Meg	0Ω	12Ω	24Ω	†1800Ω	†1300Ω	180Ω
V 2	12BE6	22KΩ	.5Ω	24Ω	36Ω	†1300Ω	†1300Ω	3.5 Meg
V 3	12BA6	3.5 Meg	0Ω	36Ω	48Ω	†150Ω	†1300Ω	270Ω
V 4	12AT6	10 Meg.	0Ω	0Ω	12Ω	1.5 Meg	0Ω	†270KΩ
V 5	35C5	180Ω	470KΩ	48Ω	83Ω	470KΩ	†1300Ω	†380Ω
V 6	35W4	Inf.	Inf.	83Ω	118Ω	130Ω	113Ω	100KΩ

† Measured From Pin 7 Of V6.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL D3910 (Fact. Model 140611) (BATTERY-LINE OPERATED)

TRUETONE MODEL D3910 (Fact. Model 140611) (BATTERY-LINE OPERATED)

TRUETONE MODEL D3910 (Fact. Model 140611) (BATTERY-LINE OPERATED)

TRUETONE MODEL D3910

TRADE NAME	Truetone, Model D3910 (Fact. Model 140611)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna.
TUBES (FOUR)	Types 1R5 Converter, 1U4 IF Amp., 1S5 DET-AVC-AF, 3V4 Power Output
POWER SUPPLY RATING:	105-125 Volts AC-DC or 7.5 Volts "A" Supply and 67.5 Volts "B" Supply .14 Amp. @ 117 Volts AC or 55MA @ 7.5 Volts DC and 10.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	545-1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an insolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (Grid) of 1R5 (V1). Low side to B-.	455KC	Tuning gang fully open	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy antenna to 200MMF to reduce hum modulation.
2.	.1MFD	"	1610KC	"	"	A5	Adjust for maximum output.
3.		Loop	1400KC	Tune for max. signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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DATE 10/49 SET #74 FOLDER #10

PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D3010

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amp.	1U4	1U4	6AR	
V3	DET.-AVC-AF Amp	1S5	1S5	6AU	
V4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	150	A18-290	AF84D20A†	UP6CJ64 †		EL-351†	Filter Red
B	30	150						Filter Yellow
C	100	10						Output Fil. Bypass Blue
C2	.05	200	A16-152	P288-05	GT2S5		TM-15	AVC Filter
C3	50	500	A15-175	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Grid Cap.
C4	.05	200	A16-152	P288-05	GT2S5		TM-15	RF Bypass
C5	.005	600	A16-153	P688-005	GT6D5	GP2M-005	TM-25	IF Grid Filter
C6	.1	200	A16-157	P288-1	GT2P1		TM-1	Filament Bypass
C7	100	500	A15-188	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C8	.005	600	A16-153	P688-005	GT6D5	GP2M-005	TM-25	Audio Coupling
C9A	50		Note	1468-00005	5W5T5	GP1K-50	1FM-45	AF Plate Bypass
B	5000		Note	1467-005	1D5D5	GP2M-005	1FM-25	AF Screen Bypass
C	5000		Note	1467-005	1D5D5	GP2M-005	1FM-25	Audio Coupling
C10	.002	200	A16-182	P688-002	GT6D2	GP2M-002	TM-22	Output Plate Bypass
C11	.05	400	A16-158	P488-05	GT4S5		TM-15	Line Filter
C12	.05	400	A16-158	P488-05	GT4S5		72P1	Line Isolation

Note. Items C9A, C9B, C9C, and R9A, R9B, and R9C are combined into one unit obtainable under MFGR'S Part No. A17-100.

† Install mounting ring. Use insulating sleeve.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	A24-178	Q13-137	15/16-63-Z	Volume control and switch
B	Switch		Not Req.	76-2	Switch DPST *	Attach to R1A per instructions

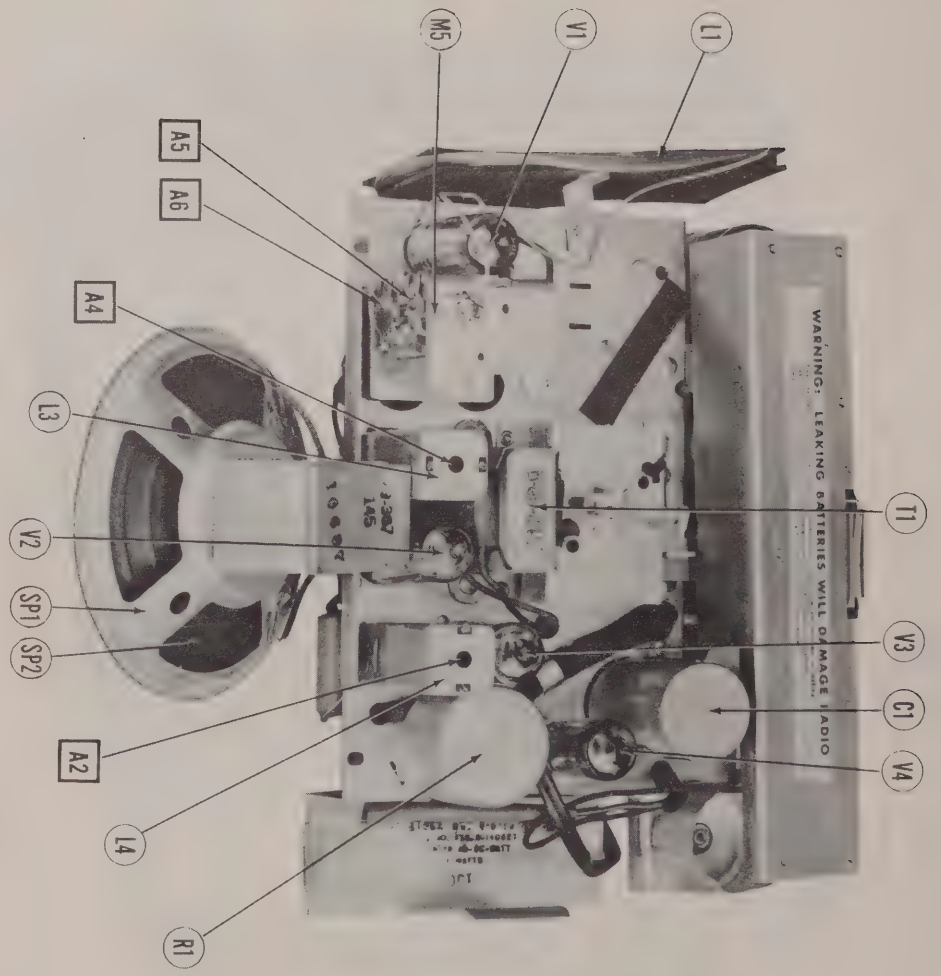
* Attached at factory.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	100KΩ	½	A60-671	BTS-100K	Osc. Grid
R3	10 Meg.	½	A60-663	BTS-10 Meg.	IF Grid
R4	1500Ω	½	A60-680	BTS-1500	Bias Network
R5	47KΩ	½	A60-685	BTS-47K	Diode Filter
R6	2.2 Meg.	½	A60-684	BTS-2.2 Meg.	AVC Network
R7	470Ω	½	A60-722	BTS-470	Filament String
R8	10 Meg.	½	A60-663	BTS-10 Meg.	AF Grid
R9A	1 Meg.	½	Note	BTS-1 Meg.	AF Plate
B	4.7 Meg.	½	Note	BTS-4.7 Meg.	AF Screen
C	2.2 Meg.	½	Note	BTS-2.2 Meg.	Output Grid
R10	1 Meg.	½	A60-668	BTS-1 Meg.	Output Grid
R11	1200Ω	½	A60-756	BTS-1200	Filament String
R12	390Ω	½	A60-665	BW-½-390	Filament String
R13	560Ω	1	A60-758	BTS-560	Bias Network
R14	2000Ω	10	A60-757	AB-2000	Filter
R15	3300Ω	2	A60-724	BW-2-3300	Filter
R16	160Ω	5	A60-725		Surge Limiter

Note. Items C9A, C9B, C9C, and R9A, R9B, and R9C are combined into one unit obtainable under MFGR'S Part No. A17-100.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	9KΩ	3.4Ω	485Ω	.5Ω	B80-245	A-3329	A-2932 ‡	RO-16 ‡	‡ Drill new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.				
SP1	PM	3.4Ω	B79-364			
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	
L1	Loop Ant.	1.2Ω		B82-58		
L2	Osc. Coil	3.5Ω	10Ω	A10-514		
L3	Input IF	16Ω	19Ω	C10-475	16-6668	
L4	Output IF	16Ω	19Ω	C10-475	16-6669	

BATTERIES

ITEM No.	VOLTAGE	TRUETONE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	7.5V "A"		950			2R			5 used in series
M2	67.5V"B"			467			XX45		

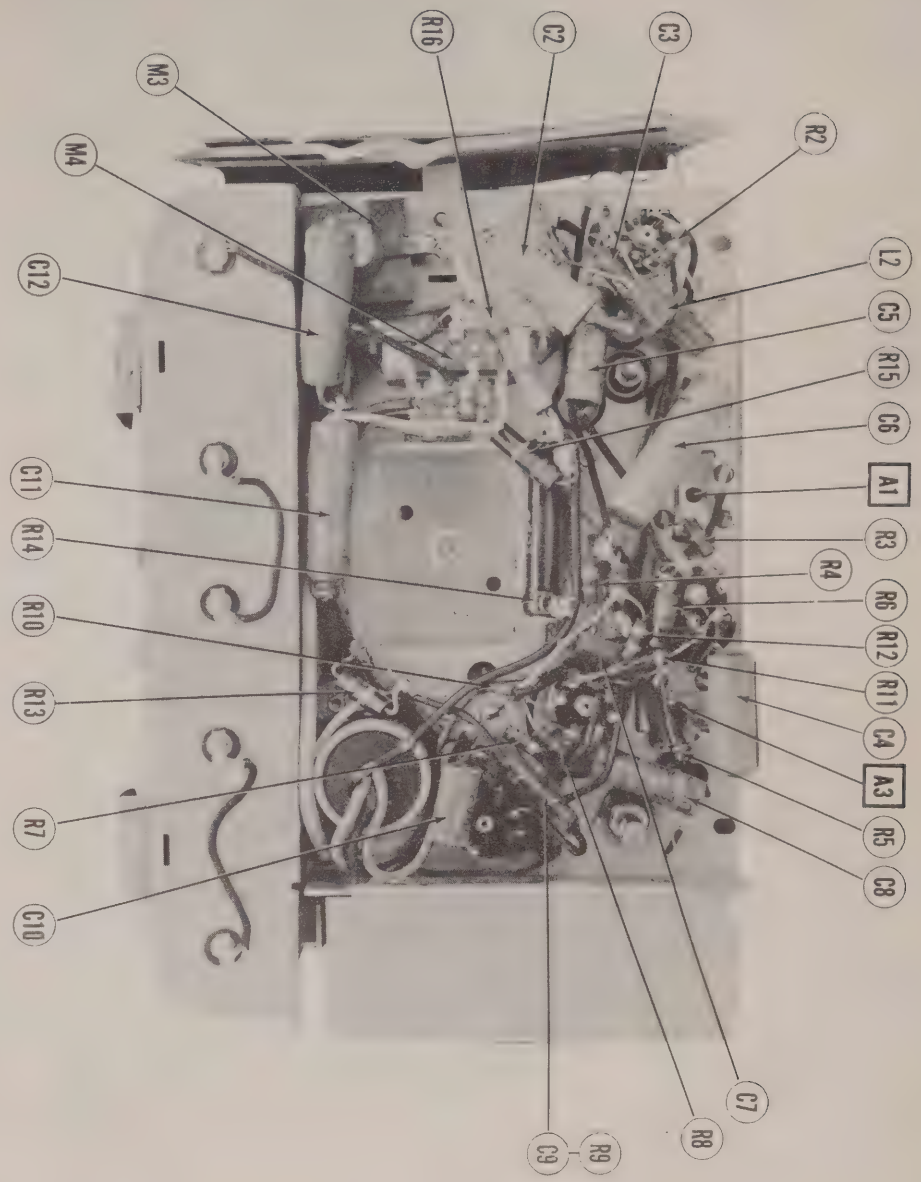
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	TRUETONE PART No.	SYLVANIA PART NO.		
M3	.065A	A83-568	NB-5		

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	Switch		AC/DC Battery
M5	2 Gang. Var. Cap.	B19-197	(28-387MMF, 24-142MMF)
	Cabinet	D42-442	
	Dial	B67-530	Tuning
	Dial	B67-531	Volume
	Knob	C52-268	Tuning
	Knob	B52-269	Volume

CHASSIS—BOTTOM VIEW



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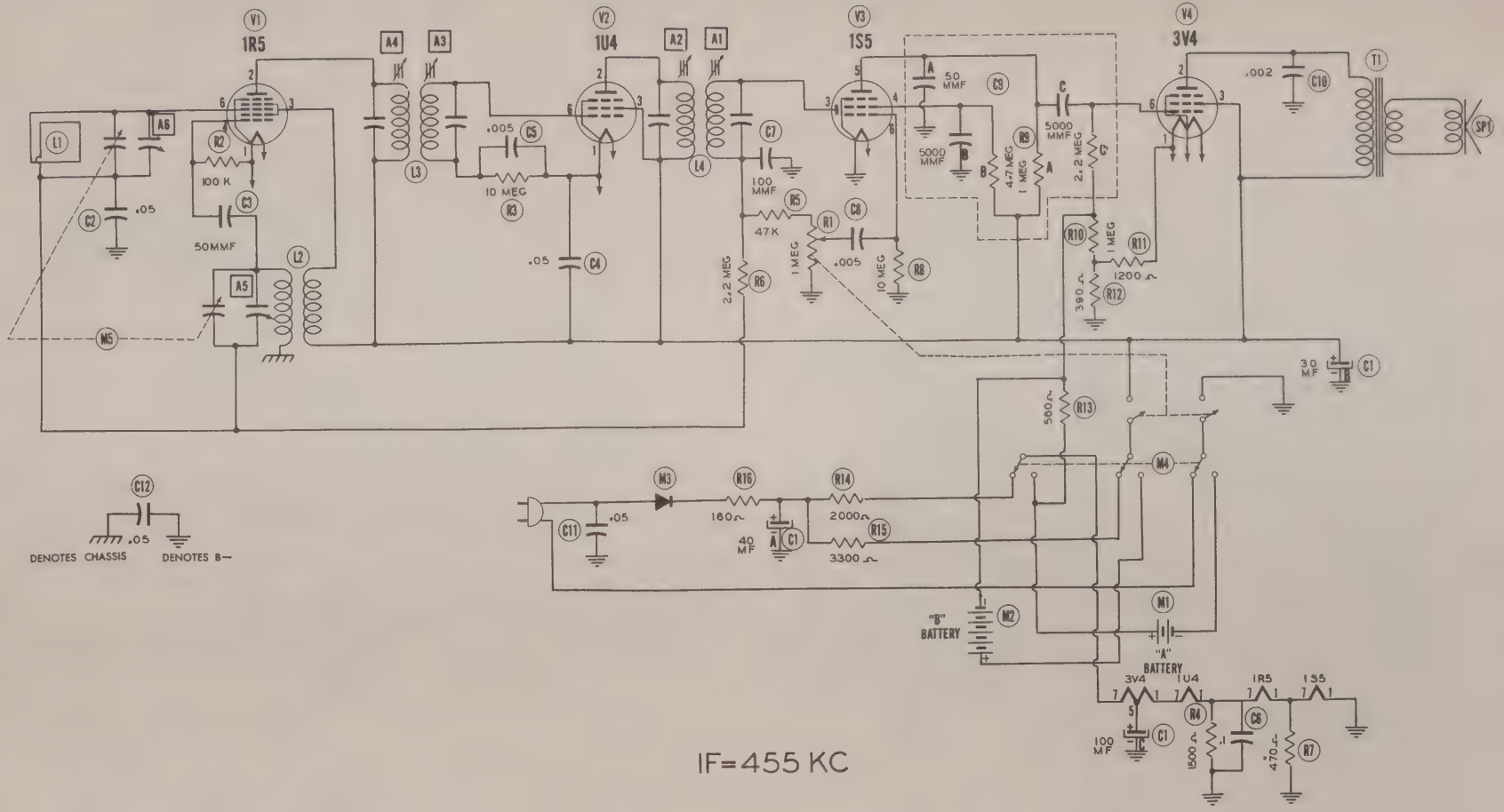
TRUETONE MODEL D2910

TRUETONE MODEL D2910



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	1.4VDC	65VDC	65VDC	§-7VDC	1.3VDC	0V	2.8VDC
V 2	1U4	2.8VDC	65VDC	65VDC	0V	2.8VDC	0V	4.2VDC
V 3	1S5	0V	.9VDC	-.2VDC	10VDC	20VDC	0V	1VDC
V 4	3V4	4.2VDC	65VDC	65VDC	0V	5.6VDC	.1VDC	7VDC

§ Taken With Vacuum Tube Voltmeter.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†3.3KΩ	†3.3KΩ	600KΩ	*	3.5 Meg	*
V 2	1U4	*	†3.3KΩ	†3.3KΩ	3.5 Meg	*	10 Meg.	*
V 3	1S5	*	†2KΩ	1 Meg.	†4.7Meg	†1 Meg.	10 Meg.	*
V 4	3V4	*	†4KΩ	†3.3KΩ	Inf.	*	3.2 Meg	*

* Do Not Use Ohmmeter To Measure Filament Resistance.
† Measured From Output Of M4.

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74-10

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FIGURE 1

WEBSTER
MODEL 246

WEBSTER
MODEL 246

GENERAL INFORMATION

The Webster Model 246 is a single-post changer, designed to play automatically up to ten 12-inch or twelve 10-inch records, not intermixed. This changer may be set to play either standard 78 R.P.M. records or the new 33⅓ R.P.M. Microgroove records. The pickup arm will return to a rest position on the rest post upon completion of the last record, and the turntable will continue rotating until the changer is turned off. Manual operation is provided for playing non-standard and home recordings.

Power supply is 105-125 volts AC at 60 cycles.

Manufactured by: **WEBSTER-CHICAGO CORPORATION**
5610 Bloomingdale Avenue • Chicago 39, Illinois

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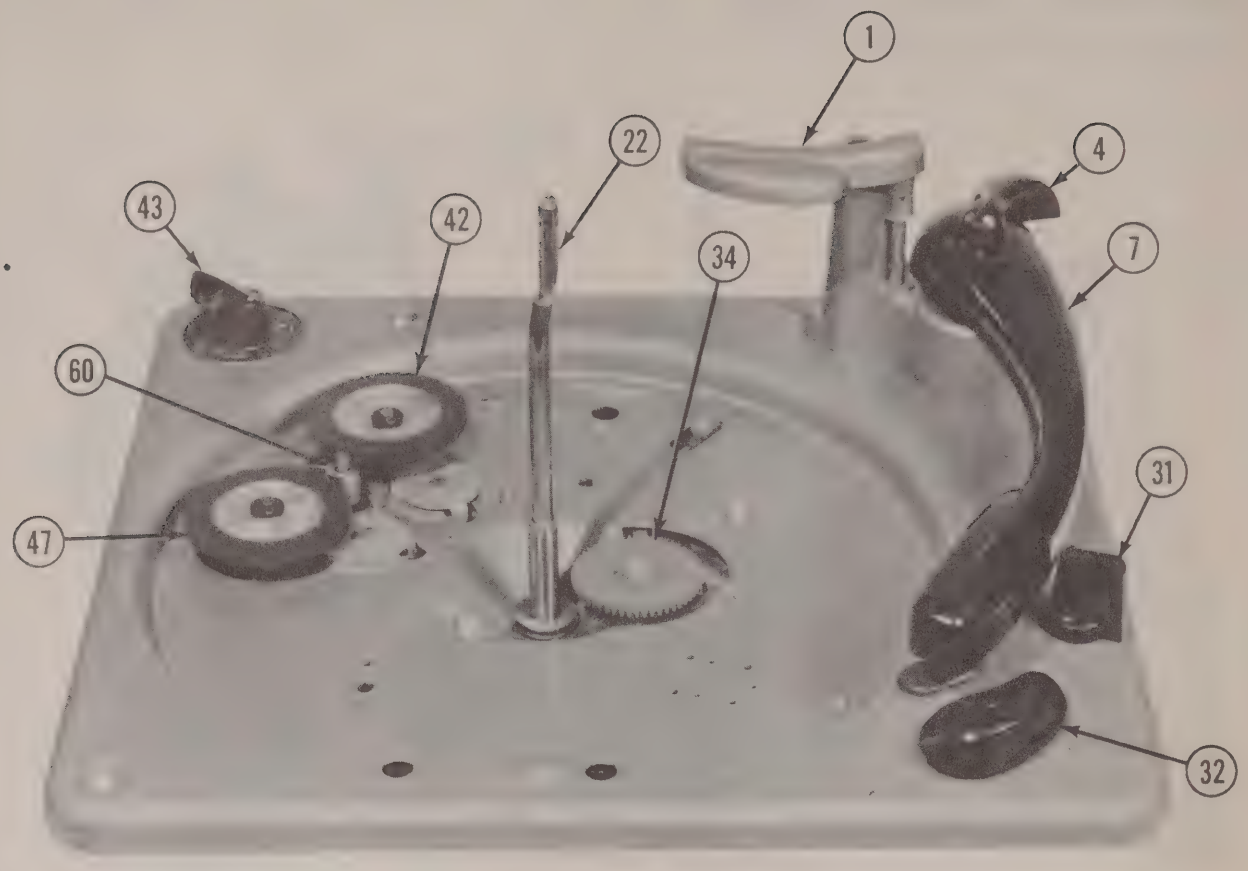

FIGURE 2

AUTOMATIC OPERATION

1. Raise the record ballast weight (1) and rotate it outward until the pin in the shaft drops into the locating groove.

2. Push the record shelf (3) forward to its location for 10-inch records, or backward for 12-inch records.

3. Place up to ten 12-inch records or twelve 10-inch records on the spindle step, allowing them to come to a rest on the shelf (3). These records may be either the standard 78 R.P.M. or the 33⅓ R.P.M. Microgroove records.

4. Turn the ballast weight (1) in and lower it to the records.

5. If the 33⅓ R.P.M. Microgroove records are to be played, swing the balance weight (4) to the rear of the pickup arm (the *red dot* should be facing the ballast weight (1)). Turn the speed control knob (43) to the position marked "33⅓." In playing standard 78 R.P.M. records, the balance weight (4) should be moved to the side of the pickup arm and the speed control knob (43) turned to the (78) position. This operation starts the turntable rotating at the proper R.P.M.

6. Move the control knob (32) to the "Reject" position and release. This starts the automatic operation of the changer which will play the entire stack of records, and upon completion of the last record, the pickup arm will be returned to a rest position on the rest post (31).

7. Turn the speed control knob (43) to the "Off" position.

8. Remove the records.

MANUAL OPERATION

1. Raise the record ballast weight (1) and move it outward until the pin in the shaft drops into the locating groove.

2. Turn the record shelf (3) to the 12-inch position. This is not necessary but permits more clearance in loading and unloading records.

3. Place the desired record on the turntable.

4. Set the balance weight (4) and the speed control (43) to the proper setting depending on the type of record to be played, 78 or 33⅓ R.P.M. (See "Automatic Operation—5.")

5. Move the control knob (32) to the "Manual" position.

6. Place the pickup arm on the record.

7. Upon the completion of the record, place the pickup arm on the arm rest (31) and turn the speed control knob (43) to the "Off" position.

CHANGE CYCLE

As the pickup arm moves toward the center of the record, it carries the automatic trip arm (80) with it through the frictional condition set up by the clutch weight (75); this holds the trip arm against the raising disc (82), which is fastened to the hinge shaft (26); the trip arm (80) gradually approaches the velocity trip lever (94), and, upon contact, carries it with it. However, the main cam actuating gear (90) has four equally spaced projections on its circumference which strike the velocity trip roller as the gear revolves. This forces the automatic trip arm (80) and the velocity trip (94) back away from the tripping point. This does not affect the pickup arm because of the friction clutch. When the needle enters the eccentric groove of the record, the automatic trip arm (80) moves at such a speed that it carries the velocity trip lever (94) to the tripping point between projections on the main gear. This releases the actuating pawl (95A) on the main cam assembly (95), allowing it to engage the main cam actuating gear (90) and driving it through the change cycle.

The main cam (95) has two cam surfaces on its lower side. The inside cam surface forms a track in which the stud of the pickup raising lever (98) rides. The outer cam surface actuates the cam lever (72) by means of the cam lever roller. As the cam rotates, the pickup arm raising lever pushes up on the raising disc (82), raising the pickup arm from the record. The stud of the raising lever is now moved toward the center of the cam. As the raising lever moves, it engages a notch in the raising disc (82), moving the pickup arm out clear of the record stack. As the cam continues to rotate, the roller of the cam lever (72) moves up the incline of the cam, causing the arm of the lever to engage and actuate the push-off blade finger (78), which, in turn, rotates the push-off blade (2) toward the spindle to drop a record.

The stud on the raising lever now moves back away from the

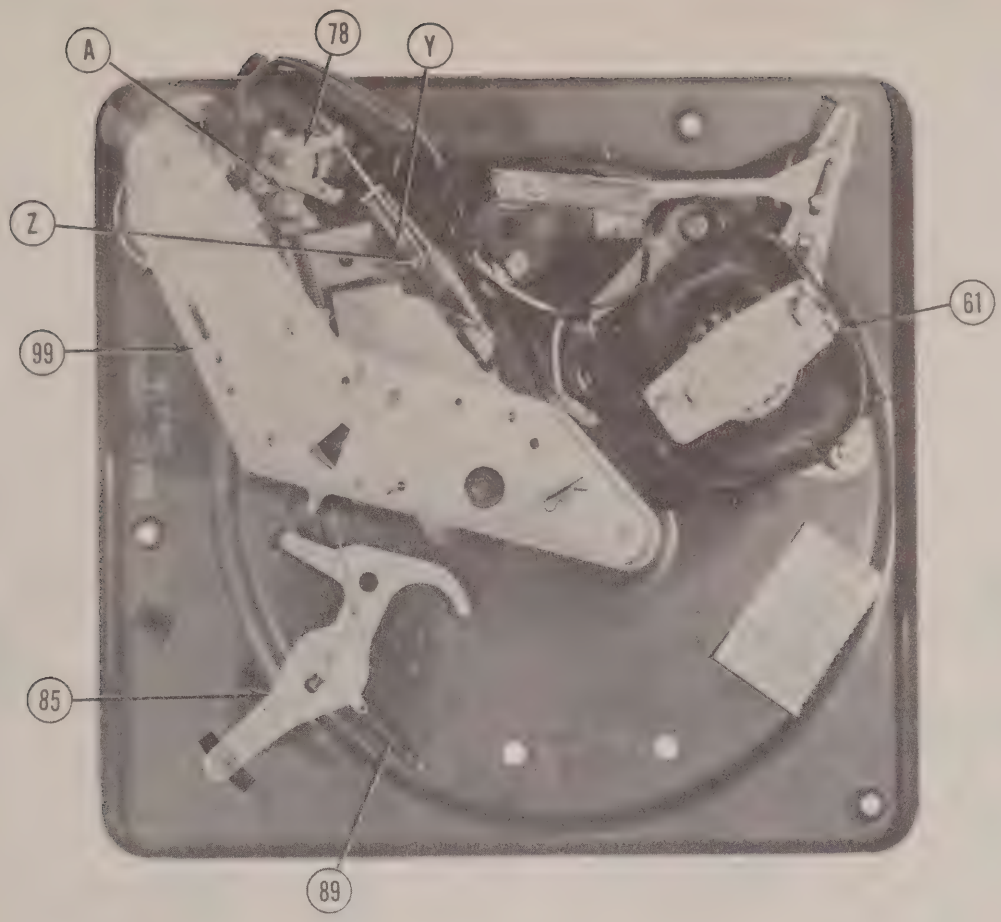

FIGURE 3

center of the cam, moving the pickup arm in to the set-down position. This position is determined by the selector lever compression spring (84). When the record shelf (3) is turned to the 10-inch position, pressure is applied by this spring to cause the raising lever stud (98) to follow the outer edge of its groove in the main cam. With the record shelf in the 12-inch position, the spring is relaxed and the stud follows the inner edge of its groove. The stud now moves up an incline, allowing the pickup arm to set down on the record.

At the same time, the roller on the cam lever moves back up its incline, returning the push-off blade to its normal position.

During the rotation of the cam, the velocity trip lever (94) has been reset by the projections on the main gear (90); therefore, when the cam has completed one revolution, the hook on the velocity trip lever catches the cam pawl and disengages the main cam from the cam actuating gear. The roller of the cam lever (72) now drops into a detent in the outer cam track which holds the main cam (95) in a stationary position, thus completing the cycle.

ADJUSTMENTS

Pickup Arm Height:

The vertical movement of the pickup arm is controlled by the angle of the pickup arm raising lever (98).
To make the adjustment:

1. Place a full stack of 10" records on the turntable.
2. Swing the balance weight (4) around to the side of the arm. This pivots the cartridge for 78 R.P.M. operation which places the cartridge to its lowest position.
3. Move the reject button (32) to reject and release.
4. Rotate the turntable by hand until the pickup arm and needle approach the stack of records.
5. Be sure that the raising lever (98) engages the notch in the raising disc (82).
6. If the clearance between the needle and the top record is not approximately 1/16", adjust by bending the raising lever (98) at point (X) in figure 5.

Caution: Bend slowly as only a slight change in angle is required.

Set-Down Adjustment:

Normally, the set-down point may be adjusted by turning the eccentric pin (16) in the mounting hinge (15). This pin is turned with a screwdriver and is reached through a hole in the top of the pickup arm. By turning the screw clockwise, the set-down point is moved toward the spindle, and counter-clockwise, to move the needle away from the spindle; however, if this adjustment does not correct the landing point of the needle, the following procedure is necessary in order to obtain correct landing:

1. Set the eccentric screw (16) to a central position.
2. Set the record shelf (3) to the 10-inch position.
3. With the power plug out, trip the mechanism by moving the control knob (32) to "Reject" and release. Rotate the turntable (by hand) clockwise, until the needle drops to within 1/8" of a 10-inch record.
4. Be sure the notch in the raising disc (82) engages the raising lever (98).
5. The No. 8 Bristol set screws in the raising disc (82) have pointed ends which fit into off-center holes in the pickup arm pivot (26). Loosen one screw and tighten the other until the needle rests above the lead-in groove of the record. Be sure both screws are tight when the adjustment is made.
6. Turn the record shelf (3) to the 12-inch position and check the needle set-down on a 12-inch record. If any additional adjustment is necessary, it should be made by the eccentric screw mentioned in the first part of the "Set-Down Adjustment."

Automatic Trip Friction Clutch:

The automatic trip friction clutch is produced by the clutch weight (75) resting on the automatic trip arm (80). This causes the automatic trip arm to follow the movement of the pickup arm. The trip arm gradually approaches the velocity trip lever (94) and, upon contact, carries it with it. However, the main cam actuating gear (90) has four equally spaced projections on

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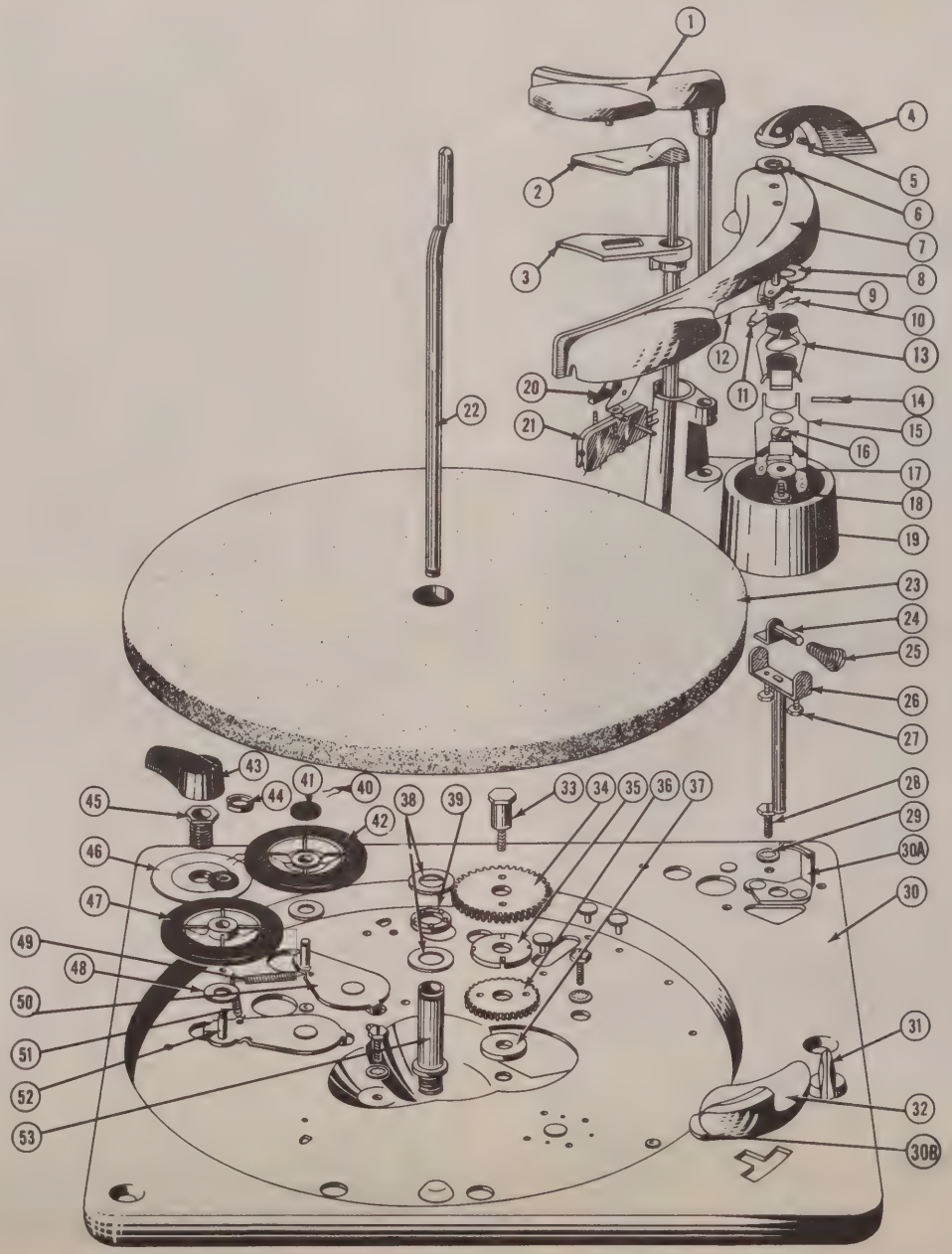

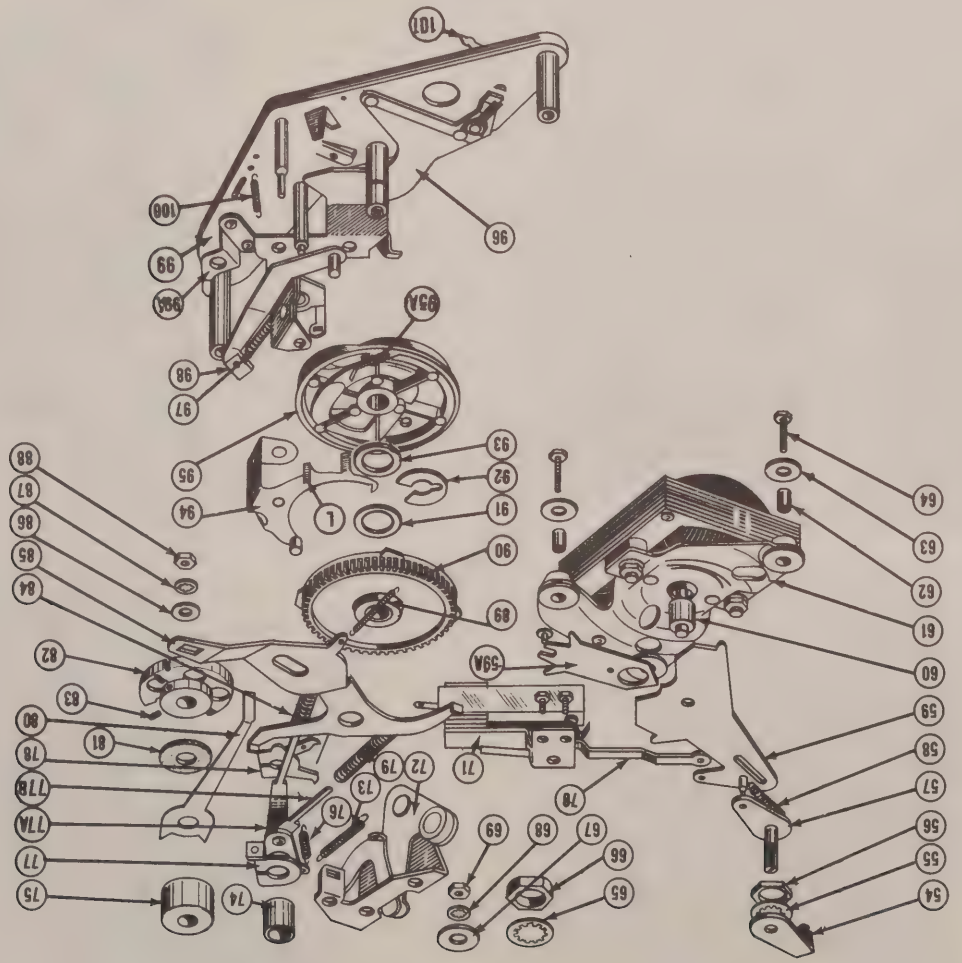
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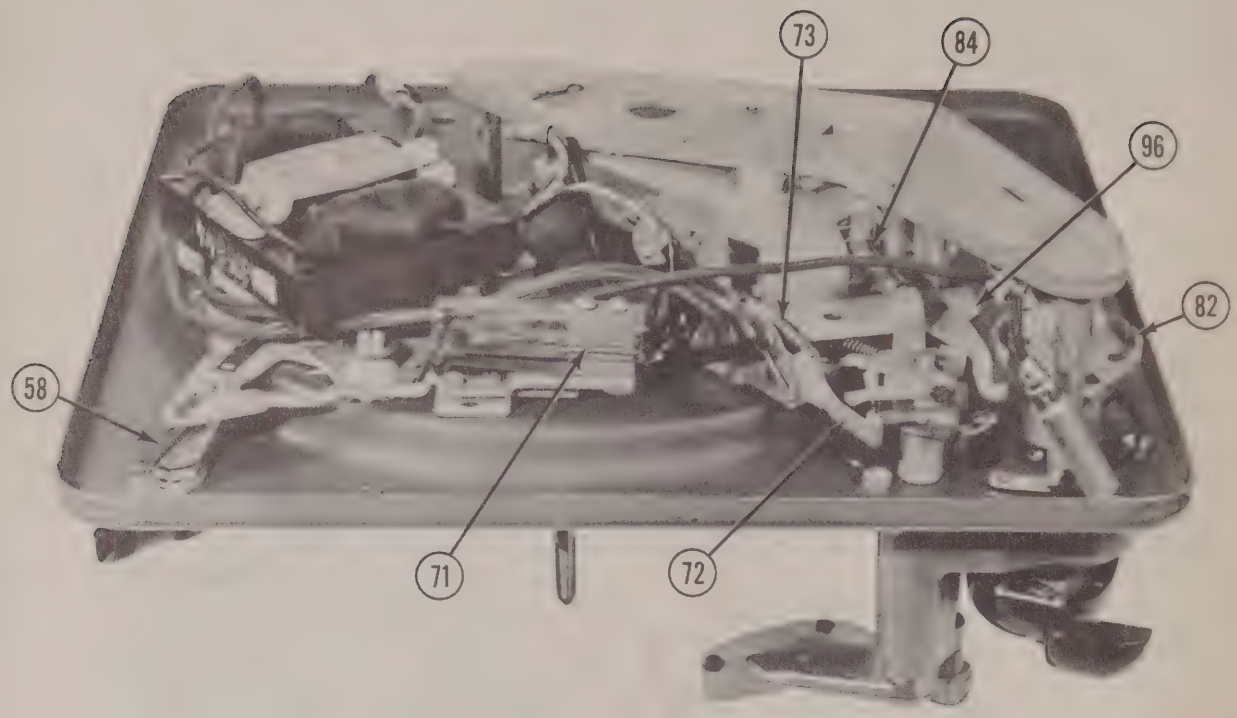


FIGURE 4

its circumference which strike the velocity trip lever roller as the gear revolves. This forces the velocity trip (94) and the automatic trip arm (80) back away from the tripping point; however, when the movement of the pickup arm toward the spindle is greater than ⅛" in ½ revolution of the turntable, the automatic trip arm (80) trips the velocity trip and roller assembly (94). This releases the actuating pawl (95A) on the main cam assembly (95), allowing it to engage the main cam actuating gear (90) and drive it through the change cycle. If the clutch does not cause the automatic trip arm to trip the mechanism clean the parts with carbon tetrachloride. This clutch should operate the trip mechanism without placing undue drag on the movement of the pickup arm.

Velocity Trip and Roller Assembly:

At the completion of the change cycle, the actuating pawl (95A) is disengaged from the main cam actuating gear (90) by the hooked end of the velocity trip lever (94) (see Exploded View). If the clearance between the lip (L) on the velocity trip lever (94) and the edge of the main cam (95), Figure 5, is too small, it will prevent the hooked end of the velocity trip lever from engaging the pawl. Adjust the clearance between the lip on the velocity trip lever (94) and the main cam (95) to be within 1/32 inch and 1/64 inch when the roller of the velocity trip lever is contacting one of the reset points on the actuating gear (90).

Positioning of the Index Lever and Toggle Assembly:

Improper positioning of the toggle assembly (77) may cause erratic indexing of the pickup arm. Indexing, in either the 10" or the 12" position, is controlled through the presence or absence of pressure from the compression spring (84) on the pickup arm raising lever bracket (98), forcing the stud to travel either the inside edge or the outside edge of the groove in the bottom of the main cam (95). A

When the record shelf is in 12" position, the spring (84) should be just free of the raising lever bracket (98), while in the 10" position, the compression of the spring holds the stud of the pickup arm raising lever against the outside edge of the groove.

For correct adjustment, the following procedure is necessary:

1. Turn the record shelf (3) to the 12" position.

2. With the power plug out, trip the changer and rotate the turntable clockwise until the push-off blade (2) reaches its farthest forward position. At this point, the cam follower (72) will be at the highest point on the main cam (95).

3. Loosen the lock bolt in the toggle assembly (77).

4. Be sure the record shelf (3) is held in the extreme 12" position while adjusting the lever and toggle assembly.

5. Push the push-off blade and record shelf assembly downward, tight against the housing (19).

6. Position the index lever and toggle assembly (77) so that there is a space of approximately 1/64" between the rounded edge of the toggle (A) and the push-off blade finger (98) when viewed directly from the bottom of the record changer. Since these two parts lie on different planes, this adjustment must be made by observation only. Figure 3 shows the relationship of these parts when the changer is out of cycle and in the 10" position.

7. While holding the push-off blade and record shelf assembly tight against the housing (19), push the index toggle assembly (77) up against the bushing (74), leaving a space of approximately 1/64" between the bushing and the base plate, and tighten the lock bolt.

Push-Off Blade Adjustment:

If the push-off blade (2) fails to extend beyond the edge of the record shelf (3) when at its greatest forward position, it should be adjusted as follows:

1. Turn the record shelf (3) to the 12" position.

2. With the power plug removed, trip the mechanism and rotate the turntable clockwise until the push-off cam follower (72) reaches the highest point on the main cam (95).

3. Loosen the push-off blade finger (78) clamp bolt.

4. Push the push-off blade (2) forward as far as possible, and hold the push-off blade and record shelf assembly downward, tight against the housing (19).

5. Tighten the push-off blade finger clamp bolt, leaving

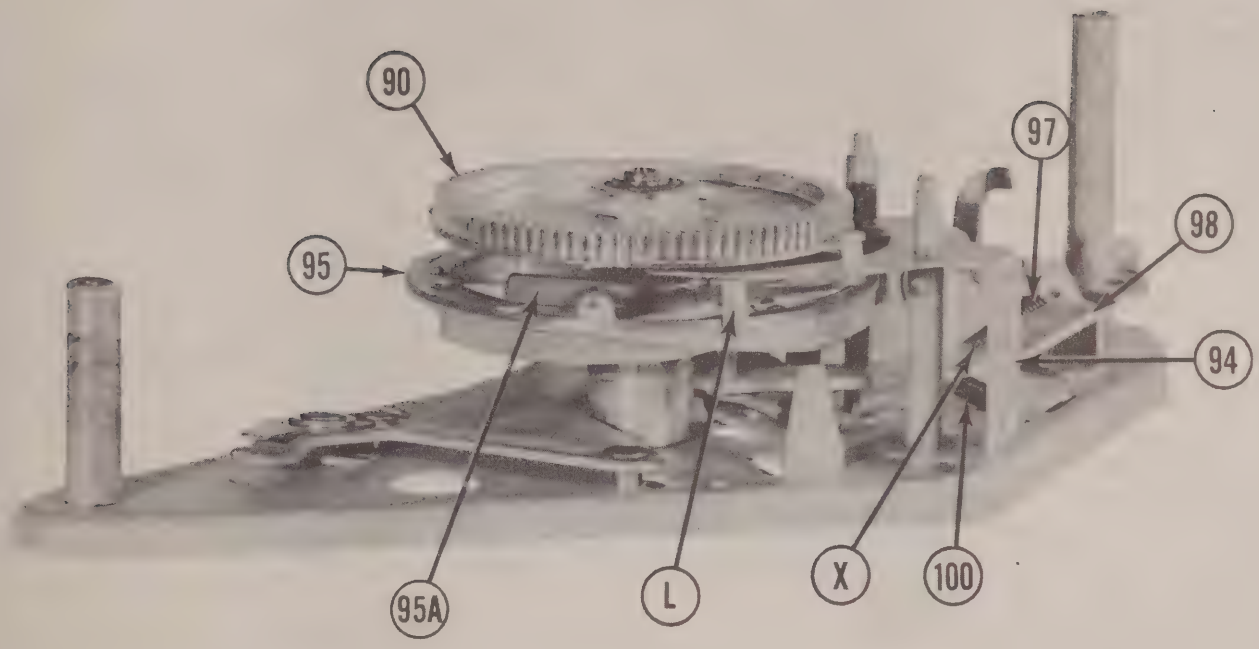


FIGURE 5

1/64" vertical clearance between the shoulder of the record shelf shaft and the push-off blade finger. Be sure the blade finger is in contact with the cam lever (72) while tightening the bolt.

Pickup Arm Rest Lever (96) Operation:

When records are present on the spindle, the rest lever (96) is held in a disengaged position in respect to the raising disc (82); however, when the last record is dropped to the turntable, the cam lever (72) has moved forward enough for the ear (Y) to pass under the finger (Z) of the rest lever (96), Figure 3, to maintain the position of the rest lever throughout the change cycle. Upon completion of the change cycle, the rest lever comes to a rest position on the raising disc. When the last record has finished playing, a new change cycle is started. As the pickup arm swings out over the arm rest, the rest lever drops off the raising disc (82) blocking any inward movement of the pickup arm. The pickup arm is now lowered to the arm rest, completing the change cycle and the operation of the rest lever (96).

Motor Control Operation:

The speed control lever (59), when actuated by the control knob, shifts the idler wheels to their proper positions. When the control knob is turned to 33⅓, idler wheel (47) is pivoted away from motor pulley (60), and the idler wheel (42) is brought into engagement with the motor shaft for 33⅓ R.P.M. turntable rotation.

In the neutral position, or "Off" position, both idler wheels are pushed away from the motor pulley and shaft by the control lever (59) engaging the lever 59A. The control lever also actuates the switch lever (70) shutting off power to the motor.

By turning the control knob to 78, idler wheel (47) is brought into contact with pulley (60), thus giving the turntable speed of 78 R.P.M.

TROUBLES

Failure to Trip:

1. Grease or oil on the automatic trip friction clutch. Clean the clutch parts with carbon tetrachloride.
2. Velocity trip and roller assembly (94) binding.
3. Trip pawl (95A) on main cam (95) binding.
4. Velocity trip and roller assembly (94) rubbing on the underside of the main cam actuating gear (95).
5. Automatic trip arm (80) bent and not hitting the velocity trip roller assembly (94).

Reject Trip Fails:

1. Trip wire on trip lever (85) bent or broken.
2. Velocity trip and roller assembly (94) binding.
3. Trip pawl on main cam (95A) binding.

Continuous Tripping:

1. Roller on velocity trip assembly (94) missing.
2. Trip lever (80) binding.
3. Velocity trip (94) not engaging the trip pawl (95A) on the main cam (95). See adjustment on "Velocity Trip and Roller Assembly."
4. Incorrect clearance between lip on trip (94) and main cam (95). See "Velocity Trip and Roller Assembly."

Records Fail to Drop:

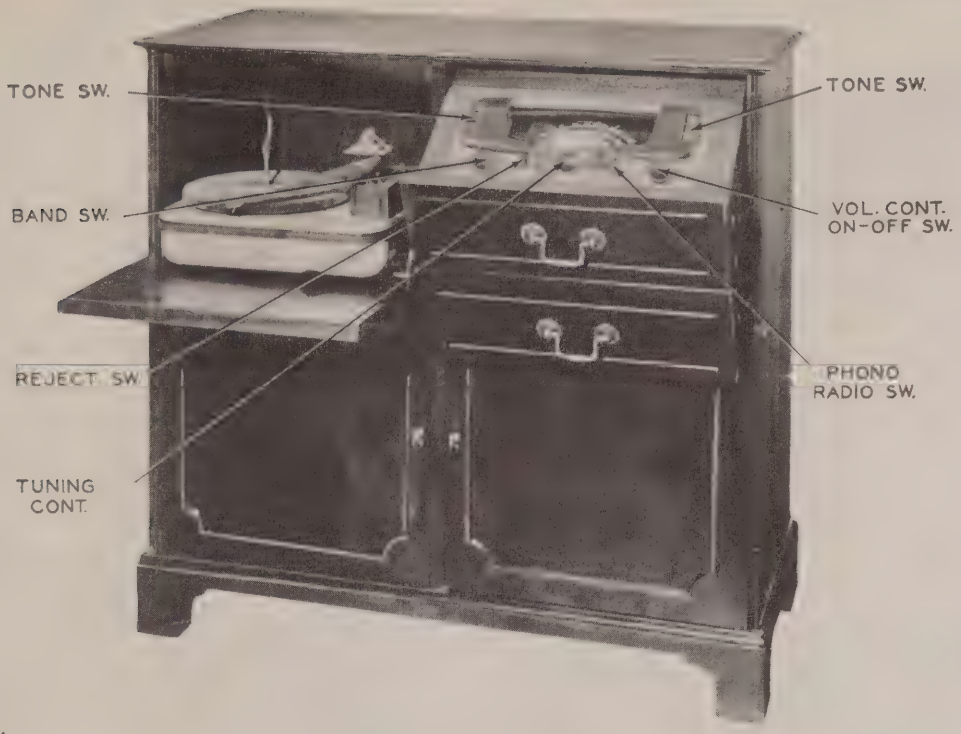
1. Push-off blade (2) out of adjustment. See "Push-Off Blade Adjustment."
2. Spring (76) loose, thereby allowing the push-off blade (2) to remain in a forward position at all times.
3. Push-off blade finger (78) bent, which results in it not being actuated by the cam lever assembly (72).

More Than One Record Drops at a Time:

1. Center hole in records too large.
2. Spindle slide not fully down. If the spindle slide is not all the way down, more than one record may drop at a time. Check the slide to see that it is free and does not bind at any point.
3. Exceptionally thin records.

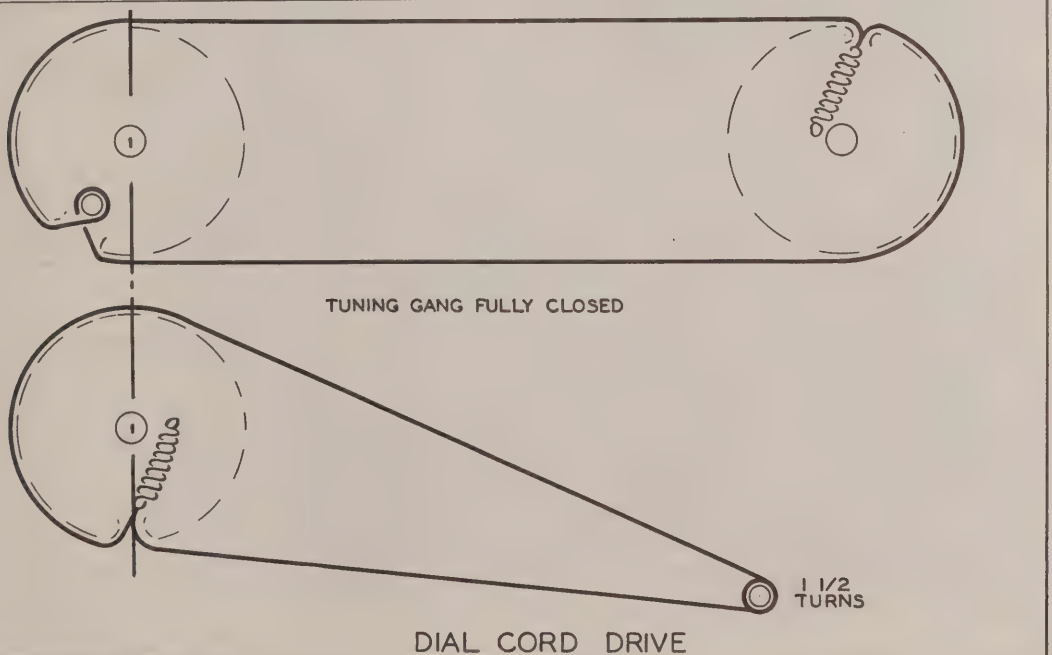
PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	42X196	Record weight assembly
2	42X183	Push-off blade
3	42X184	Record shelf
4	42P201	Pickup arm balance weight
5		Set screw (part of item 4)
6		Fiber washer
7	49X068	Pickup arm
8	45P700	Crank lever spring retainer
9	11X405	Cartridge pivot crank
10	50P125	Hairpin clip
11	46P176	Toggle spring
12	46P178	Cartridge tilt spring
13-14-15	21X283	Pickup hinge assembly
16		Horizontal adjusting screw (part of item 15)
17		Flat washer
18		Mounting screw
19	42P199	Housing
20-21	21P247	Cartridge assembly
22	11X358	Spindle
23	11X292-C	Turntable
24-25	11X386	Pickup arm counter balance
26	11X385	Hinge and shaft assembly
27		Mounting screw
28		Sub-frame mounting screw
29		Internal tooth lock washer
30		Base plate
30A		Pickup arm lift stop bracket
30B	24P004-C	Needle pad
31	49P099-C	Pickup arm rest including speed nut
32	49X-89-89-C	Control knob
33	41P333	Shoulder screw
34	47P024	Large idler gear
35	45P342	Idler gear coupler
36	47P023	Small idler gear
37	11X132	Complete gear assembly (includes items 33, 34, 35, 36 and 37)
38	25P269	Turntable bearing washer
39	11X058	Turntable bearing
40	50P125	Hairpin clip
41	25P030	Felt washer
42	11X368	Idler wheel for 33⅓ R.P.M.
43	39P044	Speed control knob
44	50P216	"C" washer
45	41P632	Control shaft bearing
46	78P410	Speed control escutcheon
47	11X366	Idler wheel for 78 R.P.M.
48	25P041	Fiber washer
49	46P134	Idler bracket tension spring for bracket 50
50	11X375	Idler bracket for 33⅓ R.P.M. wheel
51	46P179	Tension spring for bracket 52
52	11X375	Idler bracket for 78 R.P.M. wheel
53	41P414	Turntable stud
54	45P757	Bracket for tension spring 58
55	25P345	Lock washer
56	26P276	Hex nut
57	11X381	Speed control crank
58	46P175	Tension spring
59	11X397	Speed control lever
59A	45P755	Idler wheel retracting lever
60	17X450	Motor pulley
61	15X097-1	Motor
62	41P592	Motor mounting sleeve
63	25P367	Motor mounting washer
64	26P312	Motor mounting screw
65	25P333	Lock washer
66	26P687	Turntable stud nut
67		Flat washer
68		Lock washer
69		Hex nut
70		Switch control lever (part of item 59)
71	32P052	Switch
72	11X319	Cam lever and bracket assembly
73	46P158	Tension spring
74	41P607	Spacer
75	41P576	Clutch weight
76	46P162	Tension spring
77	11X287	Index compression lever and toggle assembly
78	11X312	Push-off blade finger
79	46P151	Compression spring
80	45P568	Automatic trip arm
81	23P009	Felt washer
82	11X227	Pickup arm raising disc
83		Set screw
84	46P152	Compression spring
85	11X291	Trip lever and wire assembly
86		Flat washer
87		Lock washer
88		Hex nut
89	46P117	Tension spring
90	11X032	Main cam actuating gear
91		Washer
92		"C" washer
93		Flat washer
94	11X320	Velocity trip and roller assembly
95	11X033	Main cam
96	11X316	Pickup arm rest lever
97	46P044	Raising lever tension spring
98	11X036	Pickup arm raising lever and bracket with springs
99	45P347	Sub-frame
100	46P139	Raising lever tension spring
101	50P204	Spindle retaining clip



ZENITH MODEL 9H995

TRADE NAME	Zenith, Model 9H995 (Ch. 9E21Z)	
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois	
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver with Loop Antenna	
TUBES(NINE)	Types 6BA6 RF Amp., 6BE6 Converter, 6BA6 1st IF Amp.-Phono Amp., 6AU6 2nd IF Amp., 6AU6 Limiter, 6T8 DET-AVC-AF, 6V6GT Power Output, 6J5 Phono Oscillator, 5Y3GT Rectifier	
POWER SUPPLY	110-120 Volts AC	RATING: .76 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC	FREQ. MOD. 88-108MC



DIAL CORD DRIVE

ZENITH MODEL
9H995 (Ch. 9E21Z)

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

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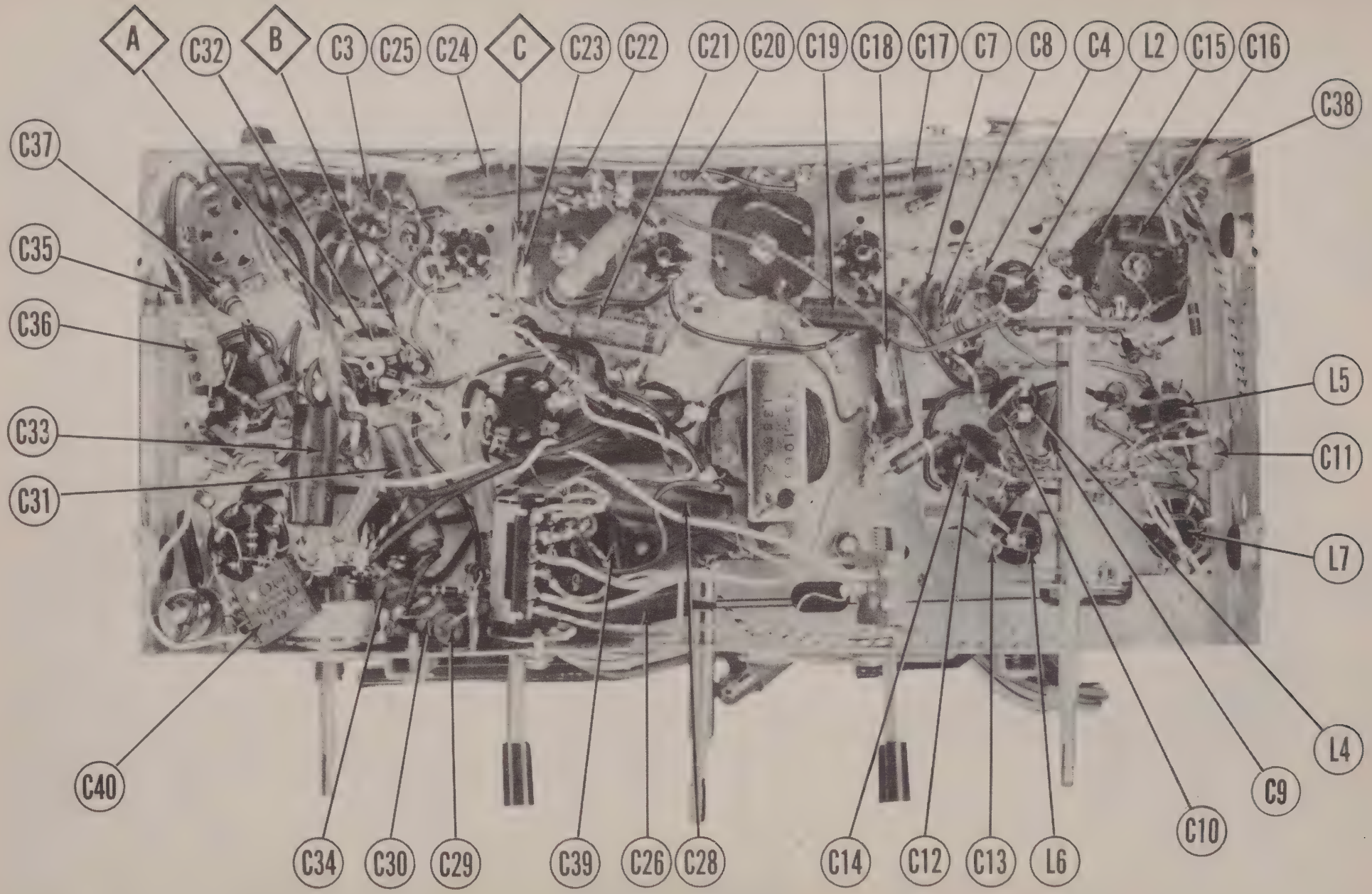
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C36
C33
C31
L5
C11
L7
L4
C9
C10
C40
C34
C30
C29
C39
C26
C28
C14
C12
C13
L6

ZENITH MODEL
9H995 (Ch. 9E21Z)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		ZENITH PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	1st IF Amp.- Phono Amp.	6BA6	6BA6	7BK	
V4	2nd IF Amp.	6AU6	6AU6	7BK	
V5	Limiter	6AU6	6AU6	7BK	
V6	DET-AVC-AF	6T8	6T8	9E	
V7	Power Output	6V6GT	6V6GT	7AC	
V8	Phono Osc.	6J5	6J5	6Q	
V9	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	40	450	22-1720	AFH88J8A	UP9CJ1100		D5172	◓ Filter
B	40	450						■ Filter
C	40	25						▲ Output Cath. Bypass
C2A	40	450	22-1884	AFH8J8H	UP4445		EL-240	◓ Filter
B	40	350						▲ Filter
C3	100		22-1669	1468-0001	5W5T1	GP1K-100	1FM-31	FM Line Ant. Coupling
C4	22		22-1506			N080-331-22		Fixed Trimmer
C5	.05	200	22-829	P288-05	GT2S5		TM-15	Ant. Coupling
C6	10		22-1489	1469-00001	5R5Q1	NP0K-10	MS-41	Fixed Trimmer
C7	1000		22-1676	1468-001	1W5D1	GP2L-001	1FM-21	RF Screen Bypass
C8	30		22-1705	1468-00004	5W5Q3	GP1K-33	MS-43	RF Cath. Bypass
C9	100		22-1669	1468-0001	5W5T1	GP1K-100	1FM-31	RF Plate Decoupling
C10	17							Fixed Trimmer
C11	.05	200	22-829	P288-05	GT2S5		TM-15	AVC Filter
C12	50		22-1664	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Grid Cap.
C13	48		22-1689					Fixed Trimmer
C14	10000		22-1706	P688-01	GT6S1	821-01	36C1	Osc. Anode Bypass Note
C15	10000		22-1706	P688-01	GT6S1	821-01	36C1	Conv. Plate Dec. Note
C16	1000	500	22-348	1468-001	1W5D1	GP2L-001	1FM-21	AVC Filter
C17	.05	200	22-829	P288-05	GT2S5		TM-15	1st IF Cath. Bypass
C18	.01	200	22-1385	P488-01	GT2S1	GP2-335-01	TM-11	1st IF Fil. Bypass
C19	.002	600	22-1220	P688-002	GT6D2	GP2M-002	TM-22	1st IF Decoupling
C20	.05	200	22-829	P288-05	GT2S5		TM-15	2nd IF Cath. Bypass
C21	.002	600	22-1220	P688-002	GT6D2	GP2M-002	TM-22	2nd IF Decoupling
C22	100		22-1669	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C23	25		22-1507	1468-00025	5W5Q25	GP1K-25	MS-425	Limiter Grid Filter
C24	.01	200	22-1385	P488-01	GT2S1	GP2-335-01	TM-11	Limiter Decoupling
C25	.01	200	22-1385	P488-01	GT2S1	GP2-335-01	TM-11	Limiter Plate Dec.
C26	.02	600	22-830	P688-02	GT6S2		TM-12	Audio Coupling
C27	250	500	22-1136	1468-00025	5W5T25	GP2K-250	1FM-325	Tone Compensation
C28	.2	200	22-1531	P488-22	GT4P2		68P18	Tone Compensation
C29	.001	200	22-1717	P688-001	GT6D1	GP2L-001	TM-21	Tone Compensation
C30	75	500	22-1256	1468-000075	5W5Q7	GP1K-75	1FM-475	Tone Compensation
C31	.01	400	22-1718	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling-Shielded
C32	100	500	22-365	1468-0001	5W5T1	GP1K-100	1FM-31	AF Plate Bypass
C33	.05	600	22-171	P688-05	GT6S5		TM-15	Audio Coupling
C34	.0022	600	22-1754	P688-0022	GT6D2	GP2M-0022	TM-22	Tone Compensation
C35	.1	200	22-1418	P288-1	GT2P1		TM-1	Phono Osc. Grid Cap
C36	47	500	22-1532	1468-00005	5W5Q5	GP1K-47	1FM-45	Osc. Feedback
C37	50		22-1664	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Feedback
C38	.02	600	22-830	P688-02	GT6S2		TM-12	Audio Coupling
C39	.002	600	22-1220	P688-002	GT6D2	GP2M-002	TM-22	Audio Coupling
C40	.005	400	22-1041	P688-005	GT6D5		TM-25	Line Filter

Note. Some Models Use 5000MMF In This Application.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	6KΩ	3.3Ω	560Ω	.6Ω	95-1063	A-3849	A-2902	RO-9‡	‡ Drill One New Mtg. Hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ZENITH PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V.C. IMP.		ST-1031		† Replace Output Transformer To Match 6-8Ω Voice Coil.
SP1	PM	3.3Ω	49-624	MOD.P12-R	12A6A	
	CONE DIA.	V.C. DIA.				
SP2	11 3/8"	1"	208-624			

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	
L1	Loop Ant.	0Ω				Two Turns Of Wire Around Cabinet
L2	FM Ant.Coil	0Ω	0Ω	S14192		
L3	RF Choke	3Ω				
L4	FM RF Coil	0Ω	0Ω	S13871		
L5	AM RF Coil	2.5Ω	10Ω	S13974	14-1057	
L6	FM Osc.Coil	0Ω		S12259		
L7	AM Osc.Coil	9.8Ω		S11157	14-1060	
L8A	1st FM IF	.5Ω				
B	1st AM IF	8Ω	8.5Ω*	S13970		* Includes Both Secondaries
L9A	2nd FM IF					
B	2nd AM IF	§10Ω		S13971		§ Includes Both Primaries
L10A	3rd FM IF		1Ω			
B	3rd AM IF	§9Ω	8Ω	S13972		
L11	Disc. Trans.	.4Ω	.4Ω	S13973		
L12	Tone Choke	2Ω		S13800		
L13	Pre-Amp.Osc Coil	2Ω		S12603		
L14	Line Choke	.1Ω		S12256		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					ZENITH PART No.		
M1	Bayonet	6-8	.25	Blue	100-36		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M2	Switch	S14260	Tone R.H.
M3	Switch	S14261	Tone L.H.
M4	Switch	85-422	Reject
M5	Switch	85-421	Phono-Radio
M6	Switch	85-424	Band
M7	3 Gang Var. Cap.	22-1678	(31-516MMF, 15-213MMF, 15-88MMF)

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	
R1A	1 Meg.	½	63-1588	Q13-137	AM-63-Z	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions

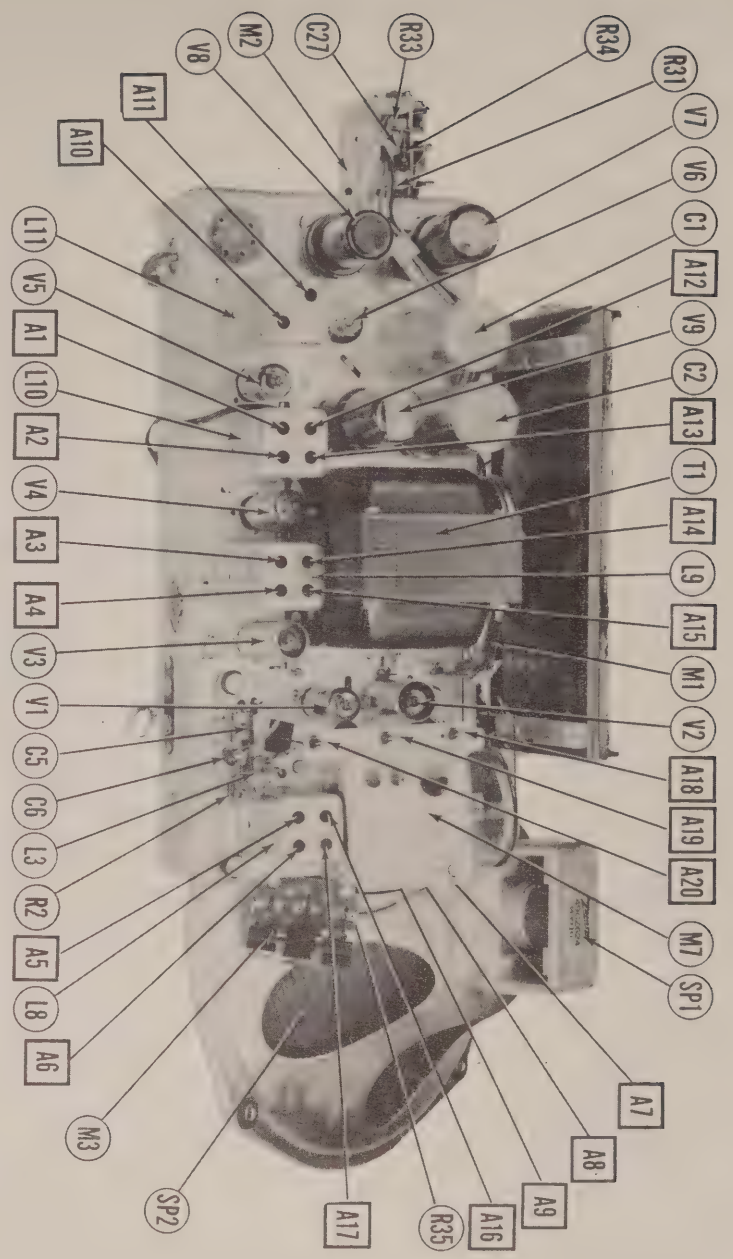
RESISTORS

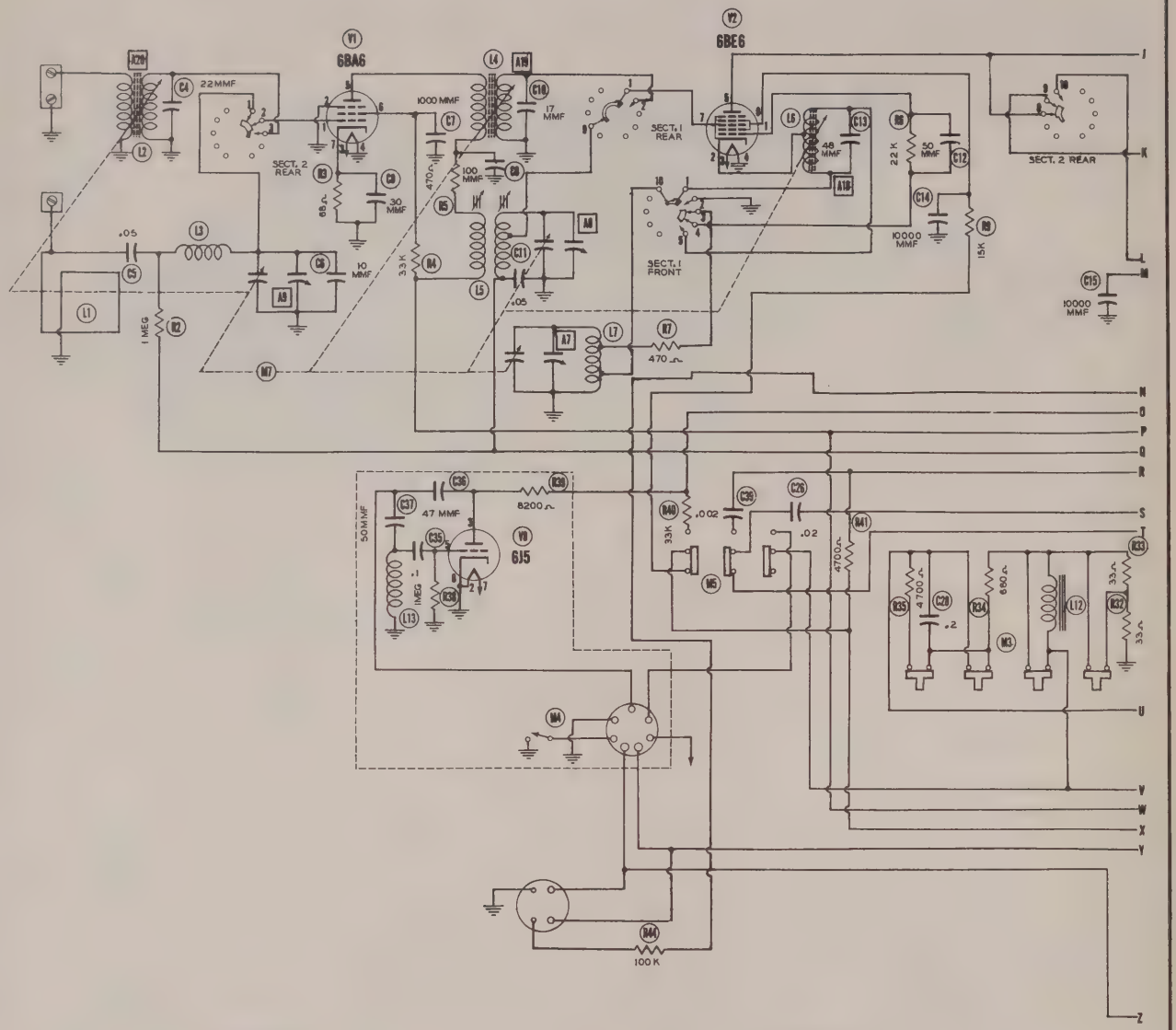
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	
R2	1 Meg.	½	63-1912	BTS-1 Meg.	AVC Network
R3	68Ω	½	63-1737	BW-½-68	RF Cathode
R4	33KΩ	1	63-957	BTA-33K	RF Screen
R5	470Ω	½	63-1772	BTS-470	RF Plate Decoupling
R6	22KΩ	½	63-1842	BTS-22K	Osc. Grid
R7	470Ω	½	63-1771	BTS-470	Parasitic Supp.
R8	2200Ω	½	63-1800	BTS-2200	Conv. Plate Decoupling
R9	15KΩ	1	63-1065	BTA-15K	Osc. Anode
R10	2.2 Meg.	½	63-1926	BTS-2.2 Meg	AVC Network
R11	220KΩ	½	63-1884	BTS-220K	AVC Network
R12	68Ω	½	63-1737	BW-½-68	1st IF Cathode
R13	680Ω	½	63-1779	BTS-680	1st IF Decoupling
R14	68Ω	½	63-1737	BW-½-68	2nd IF Cathode
R15	10KΩ	2	63-1198	BT-2-10K	2nd IF Decoupling
R16	47KΩ	½	63-1856	BTS-47K	Diode Filter
R17	220KΩ	½	63-1883	BTS-220K	Diode Load
R18	100KΩ	½	63-1870	BTS-100K	Limiter Grid
R19	8200Ω	½	63-1824	BTS-8200	Limiter Plate Decoupling
R20	22KΩ	2	63-1566	BT-2-22K	Decoup. Network
R21	3900Ω	½	63-1810	BTS-3900	Voltage Divider
R22	33KΩ	½	63-1848	BTS-33K	de-emphasis
R23	100KΩ	½	63-1869	BTS-100K	Disc. Diode Load
R24	150KΩ	½	63-1876	BTS-150K	Disc. Diode Load
R25	150KΩ	½	63-1876	BTS-150K	Disc. Diode Load
R26	15 Meg.	½	63-1918	BTS-15 Meg	AF Grid
R27	220KΩ	½	63-1883	BTS-220K	AF Plate
R28	470KΩ	½	63-1897	BTS-470K	Output Grid
R29	270Ω	1	63-1369	BW-1-270	Output Cathode Wire Wound
R30	3900Ω	½	63-1810	BTS-3900	Tone Compensation
R31	1.5 Meg.	½	63-1918	BTS-1.5 Meg	Tone Compensation
R32	33Ω	½	63-1722	BW-½-33	Tone Compensation
R33	33Ω	½	63-1722	BW-½-33	Tone Compensation
R34	680Ω	½	63-1778	BTS-680	Tone Compensation
R35	4700Ω	½	63-1813	BTS-4700	Tone Compensation
R36	390Ω	½	63-1768	BTS-390	Tone Compensation
R37	10KΩ	½	63-1827	BTS-10K	Tone Compensation
R38	1 Meg.	½	63-1911	BTS-1 Meg	Phono Pre-Amp. Grid
R39	8200Ω	½	63-1824	BTS-8200	Phono Pre-Amp. Plate
R40	33KΩ	½	63-1848	BTS-33K	Phono Pre-Amp. Plate
R41	4700Ω	1	63-1565	BTA-4700	Voltage Dropping
R42	3300Ω	2		BW-2-3300	Filter
R43A	1000Ω	5	63-1589	AB-1000	Filter Wire Wound
B	200Ω	3		AB-200	Filter Wire Wound
R44	100KΩ	½	63-1869	BTS-100K	Tone Compensation

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .76A	680VCT .103A DC	5VAC @ 2A	6.3VAC @ 3A	95-1062	P-6013#	P-2953#	PV-120A

Mount Vertically With Universal Mtg. Brackets.





VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
	V1	6BA6	-.1VDC	0V	6.3VAC	0V	250VDC	117VDC	.9VDC		
	V2A	6BE6	§-.3VDC	0V	6.3VAC	0V	245VDC	95VDC	-.1VDC		
‡	V2B	6BE6	§-.3VDC	0V	6.3VAC	0V	245VDC	87VDC	0V		
	V3	6BA6	-.2VDC	0V	0V	6.3VAC	110VDC	110VDC	.8VDC		
	V4	6AU6	0V	0V	6.3VAC	0V	142VDC	142VDC	.8VDC		
	‡V5	6AU6	-.4VDC	0V	6.3VAC	0V	20VDC	65VDC	0V		
	V6A	6T8	-.5VDC	-.5VDC	.1VDC	0V	6.3VAC	-.5VDC	0V	-.5VDC	72VDC
‡	V6B	6T8	-.6VDC	-1.7VDC	.1VDC	0V	6.3VAC	-.5VDC	0V	-.5VDC	72VDC
	V7	6V6GT	0V	6.3VAC	290VDC	245VDC	0V	290VDC	0V	12VDC	
	V8	6J5	0V	0V	50VDC	0V	§-.7VDC	0V	6.3VAC	0V	
	V9	5Y3GT	0V	300VDC	170VDC	260VAC	0V	260VAC	0V	300VDC	

§ Taken With Vacuum Tube Voltmeter.
‡ Taken In FM Position.
Note: Radio-Phono Switch In Radio Position For All Measurements Except For V8.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
	V1	6BA6	3.5 Meg	0Ω	.1Ω	0Ω	†1.5KΩ	†34KΩ	68Ω		
	V2A	6BE6	22KΩ	1Ω	.1Ω	0Ω	†3.5KΩ	†19KΩ	2.5 Meg		
‡	V2B	6BE6	22KΩ	.5Ω	.1Ω	0Ω	†3.5KΩ	†19KΩ	.5Ω		
	V3	6BA6	2.5 Meg	0Ω	0Ω	.1Ω	†10KΩ	†10KΩ	68Ω		
	V4	6AU6	3Ω	0Ω	.1Ω	0Ω	†11KΩ	†11KΩ	68Ω		
	‡V5	6AU6	100KΩ	0Ω	.1Ω	0Ω	†30KΩ	†22KΩ	0Ω		
	V6A	6T8	150KΩ	150KΩ	300KΩ	0Ω	.1Ω	220KΩ	0Ω	15 Meg	220KΩ
‡	V6B	6T8	150KΩ	150KΩ	300KΩ	0Ω	.1Ω	220KΩ	0Ω	15 Meg	220KΩ
	V7	6V6GT	0Ω	.1Ω	†600Ω	†1.2KΩ	470KΩ	†4.5KΩ	0Ω	270Ω	
	V8	6J5	0Ω	0Ω	†45KΩ	Inf.	1 Meg	2.2Ω	.1Ω	0Ω	
	V9	5Y3GT	Inf.	30KΩ	30KΩ	100Ω	Inf.	95Ω	0Ω	30KΩ	

‡ Taken In FM Position.
† Measured From Pin 2 Of V9.
Note: Radio-Phono Sw. In Radio Position For All Measurements Except V8.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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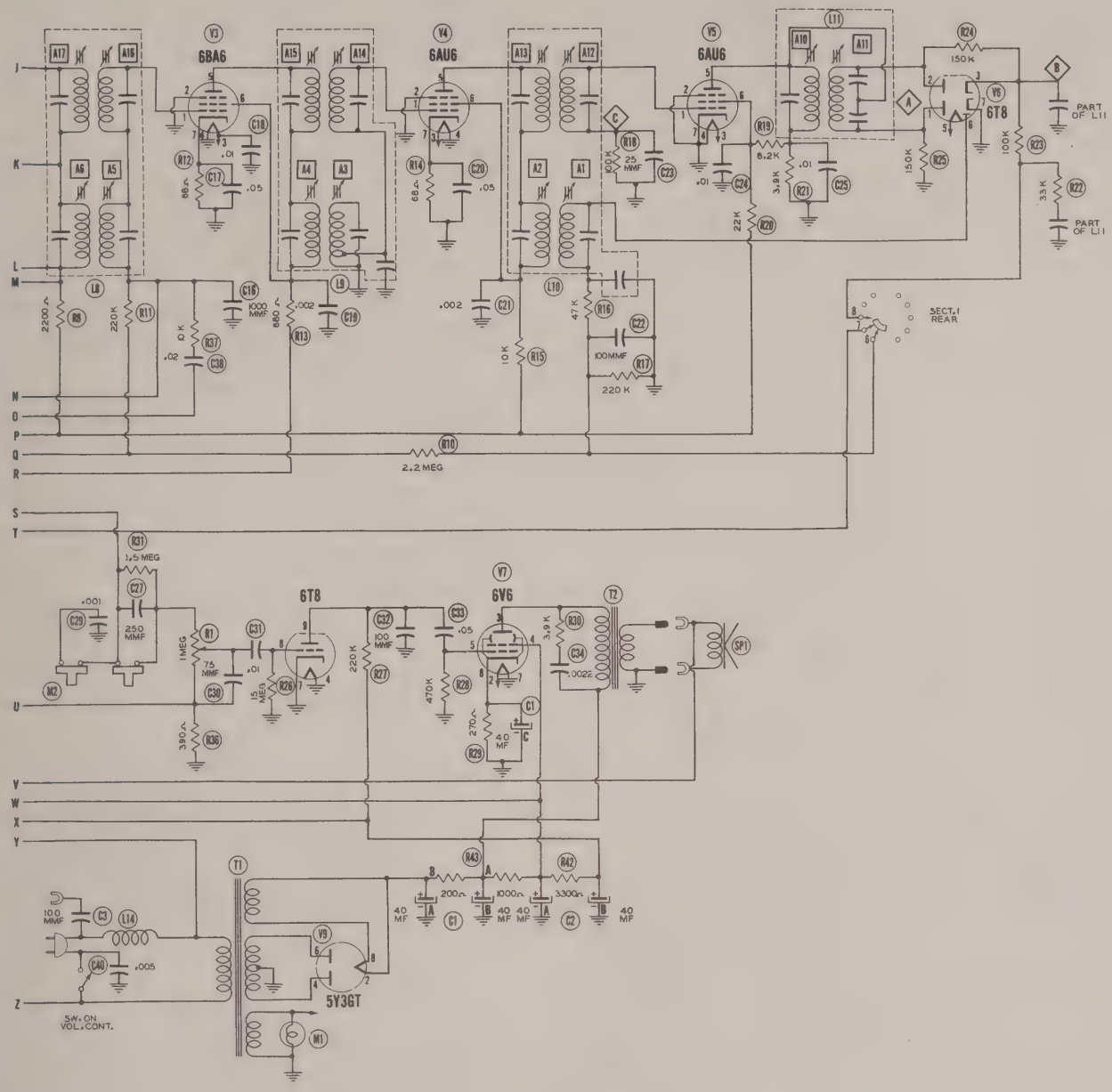

IF = 455 KC AM

IF = 10.7 MC FM

ZENITH MODEL 9H995 (Ch. 9E21Z)

PAGE 7

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning gang fully open and set pointer to white dots at the high frequency end of the dial scale.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis.	455KC (400∿ Mod.)	AM (counter clock-wise)	Tuning gang fully closed	Across voice coil	A1,A2, A3,A4 A5,A6	Adjust for maximum output.
2.		Loop	1600KC (400∿ Mod.)	"	1600KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC (400∿ Mod.)	"	1400KC	"	A8,A9	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.05MFD	High side to pin 1 (Grid) of 6AU6 (V5). Low side to chassis.	10.7MC (Unmod.)	FM (clock-wise)	Point of non interference	DC Probe to Point (A) Common to chassis.	A10	Adjust for maximum deflection.
5.	.05MFD	"	"	"	"	DC Probe to Point (B) Common to chassis.	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	.05MFD	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	"	"	"	DC Probe to Point (C) Common to chassis.	A12, A13	Adjust for maximum deflection.
7.	.05MFD	High side to pin 1 (Grid) of 6BA6 (V3). Low side to chassis.	"	"	"	"	A14, A15	"
8.	.05MFD	High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis.	"	"	"	"	A16, A17	"

FIG. 1

FIG. 2

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	10.7MC (450KC Sweep)	FM (clock-wise)	Point of non interference	Vert.Amp. to Point (D) Low side to chassis.	A12, A13	Adjust for maximum amplitude and symmetry as per Fig 1.
5.	.01MFD	High side to pin 1 (Grid) of 6BA6 (V3). Low side to chassis.	"	"	"	"	A14, A15	"
6.	.01MFD	High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis.	"	"	"	"	A16, A17	"
7.	.01MFD	"	"	"	"	Vert.Amp. to Point (D) Low side to chassis.	A10, A11	Adjust A11 so 10.7MC marker occurs at center of crossover lines as per Fig 2. Adjust A10 for maximum amplitude and straightness of cross-over lines. Continue with step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω carbon res.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	98MC (Unmod.)	FM	98MC	DC Probe to Point (C) Common to chas-sis.	A18	Adjust for maximum deflection.
10.	"	"	"	"	"	"	A19, A20	"

DISASSEMBLY INSTRUCTIONS

1. Remove 3 large push-on type knobs from receiver controls.
2. Remove rear cover of phono compartment.
3. Disconnect phono plug from top left rear of receiver chassis.
4. Remove speaker bananna plugs at speaker.
5. Remove AM antenna plugs from terminals on top right rear of receiver chassis.
6. Free wires from clamps holding them to cabinet.
7. From front of cabinet, open radio pull out door and pull up gently on brown panels containing tone switches.
8. Remove 2 phillips head screws holding each tone switch unit to brown panels. Remove brown panels.
9. Remove 2 phillips head screws from each end of radio pull out door supporting radio chassis.
10. Feed tone switches thru mounting holes and remove receiver chassis.
11. Remove four 5/16" hex nuts holding speaker to cabinet. Remove speaker.

PHOTOFACT* Folder

ZENITH MODELS
28T964R (CH. 28F23),
42T999RLP (CH. 28F23)

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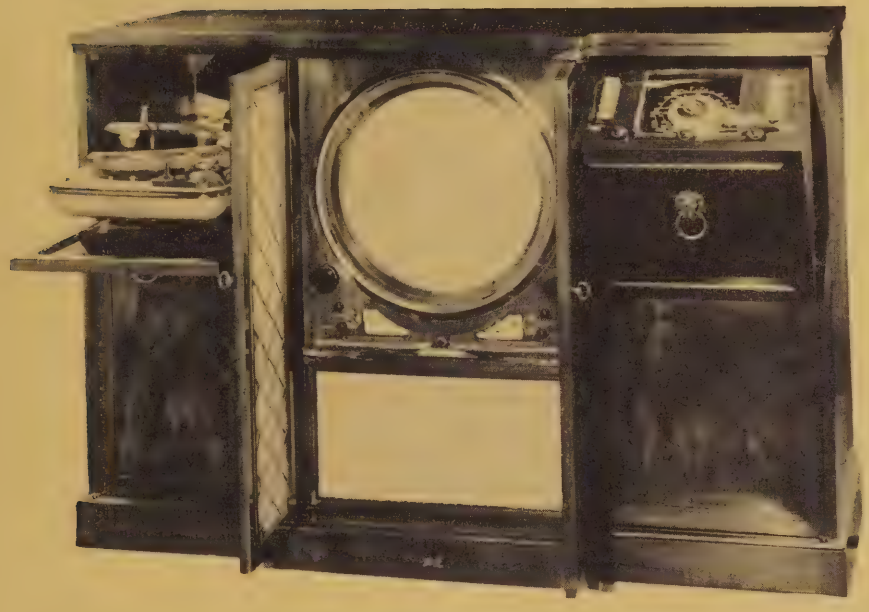

MODEL 42T999RLP

ZENITH MODELS
28T964R (CH. 28F23),
42T999RLP (CH. 28F23)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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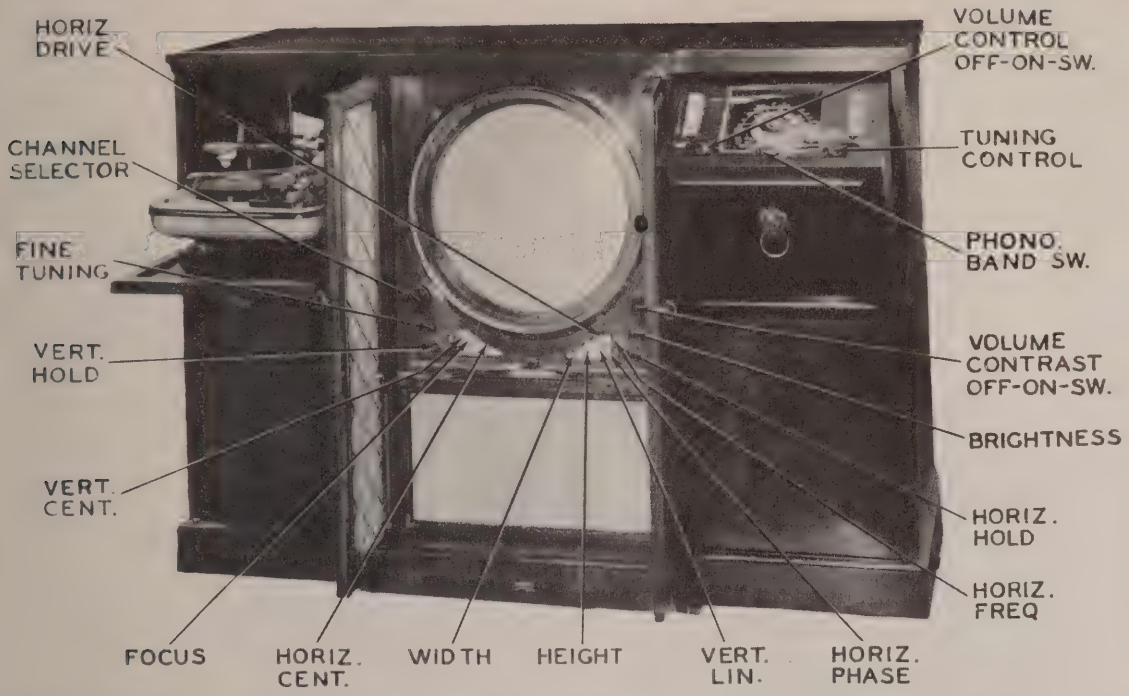
Date 10/49 Set No. 74—Folder No. 13



ZENITH MODEL 42T999RLP

TRADE NAME	Zenith Models 28T964R, 42T999RLP, (Ch. 28F23)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AM-FM-Phono-TV Combination Receiver
TUBES	Forty-Three
POWER SUPPLY	110-120 Volts, 60 Cycle
TUNING RANGE	AM 550-1600KC SW 9-12MC FM 42-49MC 88-108MC TV Channels 2 thru 13
RATING:	2.8 Amp. @ 117 Volts AC (TV) 1.45 Amp. @ 117 Volts AC (Radio)

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ZENITH MODELS
28T964R, 42T999RLP (Ch. 28F23)

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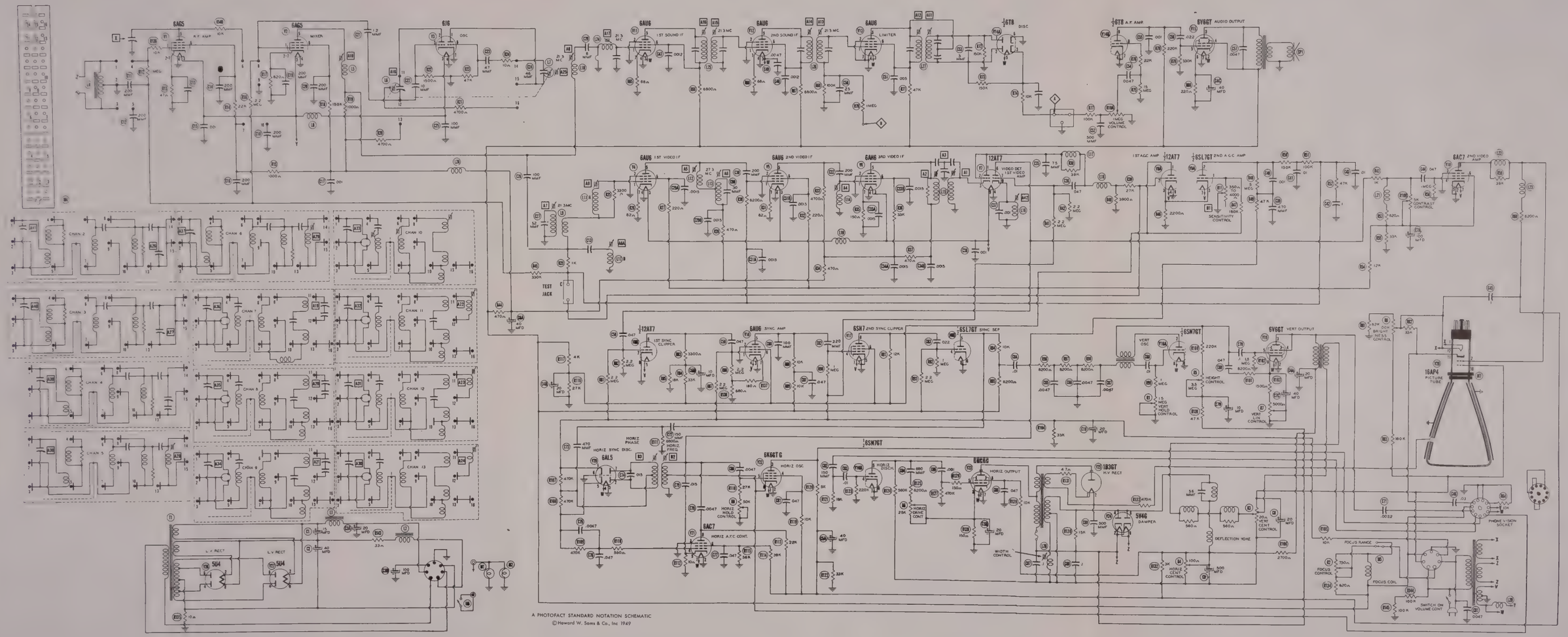

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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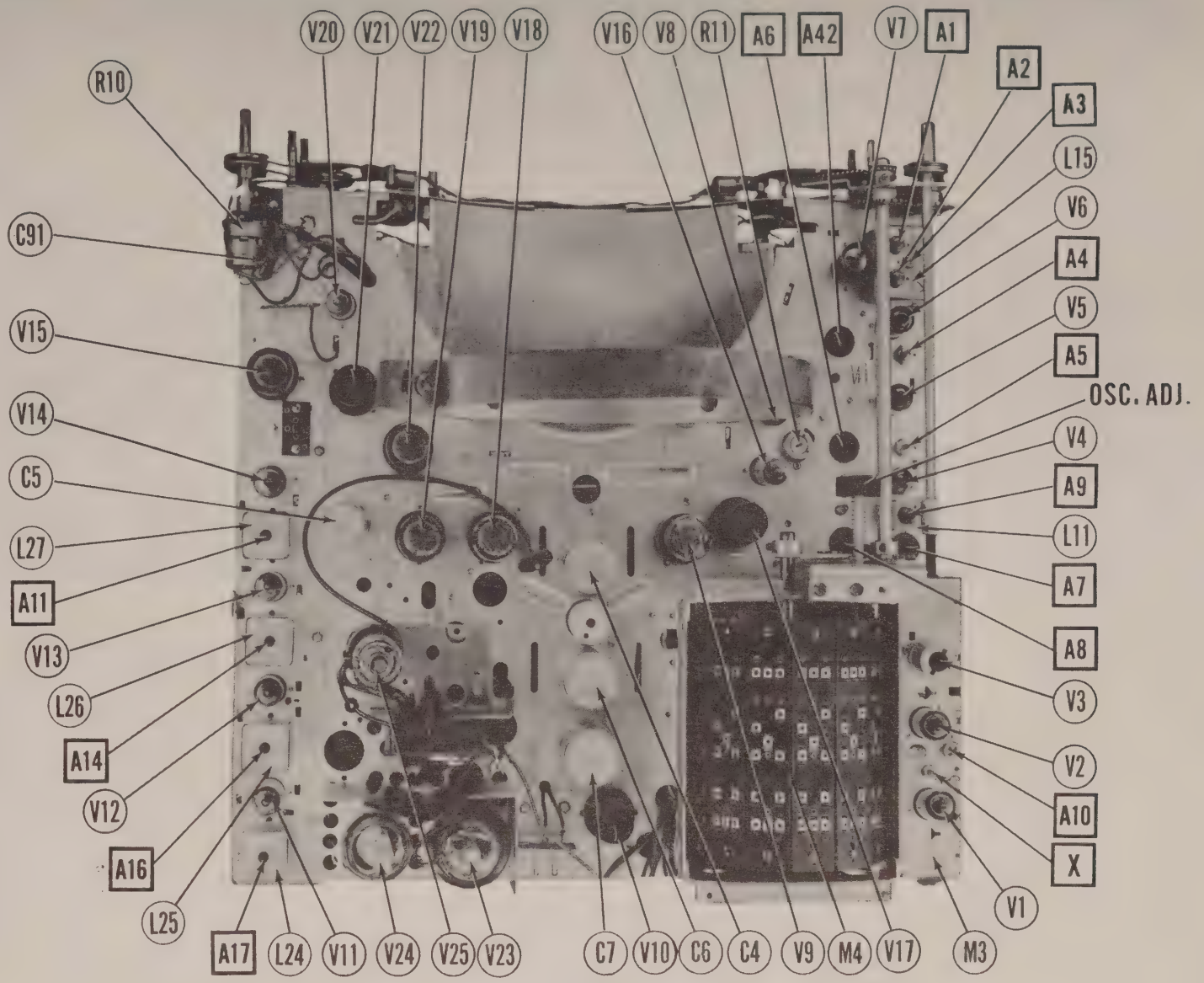
ZENITH MODELS
28T964R, 42T999RLP (Ch. 28F23)



CHASSIS TOP VIEW

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TV-ALIGNMENT INSTRUCTIONS

VIDEO IF ALIGNMENT

These receivers are made in two versions. The narrow band version is for use in fringe areas, the wide band version is used for local signal reception.

The narrow band version is identified by a green dot painted on the top of the third video IF transformer can. Determine which version you have, and use the video IF alignment for that set.

Connect a -1.5 volt bias battery to AGC line. Remove the AGC tube (V8) and connect the negative side of the bias battery to test jack "C" and the positive side to chassis.

Connect the synchronized sweep voltage from the signal generator to the oscilloscope horizontal amplifier input for horizontal deflection.

Remove the oscillator tube (V3) during the video IF alignment.

To disable the high voltage remove the horizontal oscillator tube (V22) from its socket.

BROAD BAND VIDEO IF ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	500MMF	High side to pin 1 (Grid) of 6AH6 (V6). Low side to chassis.	24MC (10MC Sweep)	21.6MC 25.9MC	Any	Vert. Amp. thru 100KΩ to test jack "S". Low side to chassis.	A1, A2 A3	Adjust A1 and A2 to obtain pattern as per Fig 1 with peaks being of equal amplitude and the 21.6MC marker properly placed on the pattern. Adjust A3 to place 25.9MC marker at the high freq. peak. Check position of 21.6MC marker. If necessary repeat adjustment of A1, A2 and A3.
2.	500MMF	High side to pin 1 (Grid) of 6AU6 (V5). Low side to chassis.	"	25.3MC	"	"	A4	Reduce sweep generator output until amplitude is approximately same as that obtained in step 1. Adjust A4 for pattern and placement of 25.3MC marker as per Fig 2.
3.	500MMF	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	"	22.2MC 25.1MC	"	"	A5	Adjust for pattern and placement of 22.2MC marker as per Fig 3. The 25.1MC should fall approximately as shown in Fig 3.
4.	500MMF	"	"	27.3MC	"	"	A6	Use maximum marker amplitude and adjust trap A6 so 27.3MC marker disappears at "notch" as per Fig 3.
5.	Direct	High side to an ungrounded tube shield slipped over the converter tube. Low side to chassis.	"	21.3MC	"	"	A7, A8	Adjust traps A7 and A8 for minimum indication of 21.3MC marker as per Fig 4.
6.	Direct	"	"	21.3MC 22.2MC 25.1MC 25.8MC 27.3MC	"	"	A9,A10	Adjust A9 and A10 alternately for reasonably flat topped pattern as per Fig 4. Check markers to see that they appear at proper points on the pattern. The 25.8MC marker is located at 50% on the high freq. slope side of the overall video IF pattern (Fig 4).

NARROW BAND VIDEO IF ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	500MMF	High side to pin 1 (Grid) of 6AH6 (V6). Low side to chassis.	24MC (10MC Sweep)	22.6MC 25.9MC	Any	Vert. Amp. thru 100KΩ to test jack "S". Low side to chassis.	A1,A2, A3	Adjust A1 and A2 to obtain pattern as per Fig 1A with peaks of equal amplitude and the 22.6MC marker properly placed on the pattern. Adjust A3 to place the 25.9MC marker at the high frequency peak. Check position of 22.6MC marker. If necessary repeat adjustment of A1,A2 and A3.
2.	500MMF	High side to pin 1 (Grid) of 6AU6 (V5). Low side to chassis.	"	25.3MC	"	"	A4	Reduce sweep generator output until amplitude is approximately same as that obtained in step 1. Adjust A4 for pattern and placement of 25.3MC marker as shown in Fig 2.
3.	500MMF	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	"	23.2MC 25.2MC	"	"	A5	Adjust for pattern and placement of 23.2MC marker as per Fig 3A.the 25.2MC marker should fall approximately as shown in Fig 3A.
4.	500MMF	"	"	27.3MC	"	"	A6,A6a	Use maximum marker amplitude and adjust A6 and A6a so 27.3MC marker disappears at "notch" as per Fig 3A. Note. A6a appears only in "narrow band" version.
5.	Direct	High side to an ungrounded tube shield floating over convertor tube. Low side to chassis.	"	21.3MC	"	"	A7,A8	Adjust traps A7 and A8 for minimum indication of 21.3MC marker as per Fig 4A.
6.	Direct	"	"	21.3MC 23.2MC 25.1MC 25.8MC 27.3MC	"	"	A9,A10	Adjust A9 and A10 alternately for reasonably flat topped pattern as per Fig 4A. Check markers to see that they appear at proper points on the pattern. The 25.8MC marker is located at 50% on the high frequency slope side of the overall video IF pattern (Fig 4A).

TV-ALIGNMENT INSTRUCTIONS (CONT.)

SOUND IF ALIGNMENT

The sound IF transformers used in this receiver have specially designed slugs and require a special alignment tool. (Zenith Part No. 68-7). Both slugs of each transformer are accessible from the hole in the top of the transformer. The alignment wrench is partially inserted to align the top winding and fully inserted to adjust the slug for the bottom winding.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	500MMF	High side to pin 1 (Grid) of 6AU6 (V13) Low side to chassis.	24MC (1MC Sweep)	21.3MC	Any	Vert. Amp. to Point Ⓐ Low side to chassis.	A11, A12	Adjust A11 and A12 for maximum amplitude and symmetry as per Fig 5 with 21.3MC marker at center. The peak to peak discriminator width is approximately 450KC.
8.	500MMF	High side to pin 1 (Grid) of 6AU6 (V12) Low side to chassis.	"	"	"	Vert. Amp. to Point Ⓑ Low side to chassis.	A13, A14	Adjust for maximum amplitude and symmetry as per Fig 6.
9.	500MMF	High side to pin 1 (Grid) of 6AU6 (V11) Low side to chassis.	"	"	"	"	A15, A16	"
10.	500MMF	High side to an ungrounded tube shield placed over the mixer tube (V2). Low side to chassis.	"	"	"	"	A17	"

OSCILLATOR ALIGNMENT

The trimmer X located in the plate circuit of the RF Amp. is for compensation of interelectrode capacity of the tube and capacity of the circuit wiring and is pre-set at the factory. Do not adjust in field unless proper equipment is available. It is suggested that the oscillator circuits be checked before attempting alignment to determine if adjustment is actually necessary. This is done by connecting the signal generator and VTVM as outlined below in step 11. Set the signal generator to the sound carrier frequency of the channel being checked and turn the fine tuning control. The VTVM will indicate both a positive and negative peak as the fine tuning control passes through resonance. The proper adjustment is the zero point between the two peaks. If the zero point cannot be obtained, alignment of the oscillator circuits should be performed in the order given starting with step 11. The oscillator adjustments are made by depressing knob at the front end of the tuner except for A18 and A25 which are shown in side view photograph of the tuner.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	Two 150Ω carbon res.	Across Antenna terminals with 150Ω resistor in each lead.	197.75MC	10	DC Probe to Point Ⓐ Common to chassis.	A18	Pre-set the fine tuning control so that the widest area of the eccentric tuning slugs points upward. Insert a pointed tool thru one of the adjustment slots and turn A18 (air trimmer disc.) until zero point between the positive and negative peaks is obtained.
12.	Two 150Ω carbon res.	"	179.75MC 185.75MC 191.75MC 203.75MC 209.75MC 215.75MC	7 8 9 11 12 13	"	A19 A20 A21 A22 A23 A24	Pre-set fine tuning as above and adjust A19 thru A24 for zero reading at their respective channels.
13.	"	"	71.25MC	4	"	A25	Pre-set fine tuning control as above and adjust slug A25 for zero reading.
14.	"	"	59.75MC 65.75MC 81.75MC 87.75MC	2 3 5 6	"	A26 A27 A28 A29	Pre-set fine tuning control as above and adjust A26 thru A29 at their respective channels.

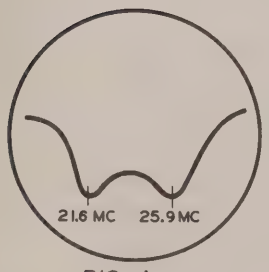


FIG. 1

FIG. 1A

FIG. 2

FIG. 3

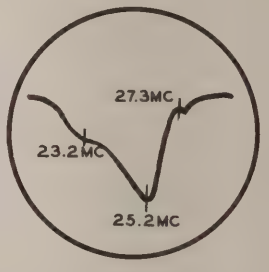


FIG. 3A

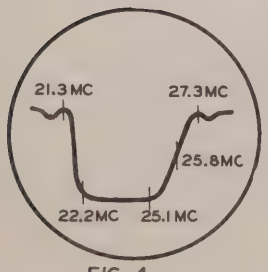


FIG. 4.

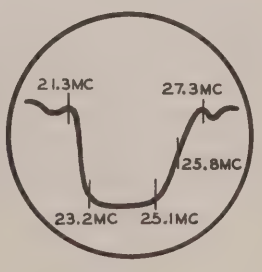


FIG. 4A

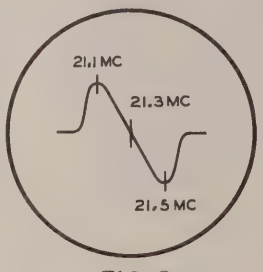


FIG. 5

FIG. 6

FIG. 7

TV-ALIGNMENT INSTRUCTIONS (CONT.)

ANTENNA ALIGNMENT

Remove the AGC tube (V8) and connect -1.5 volt bias battery from test jack "C" to chassis.
The antenna adjustments are accessible through hole in rear of the tuner.

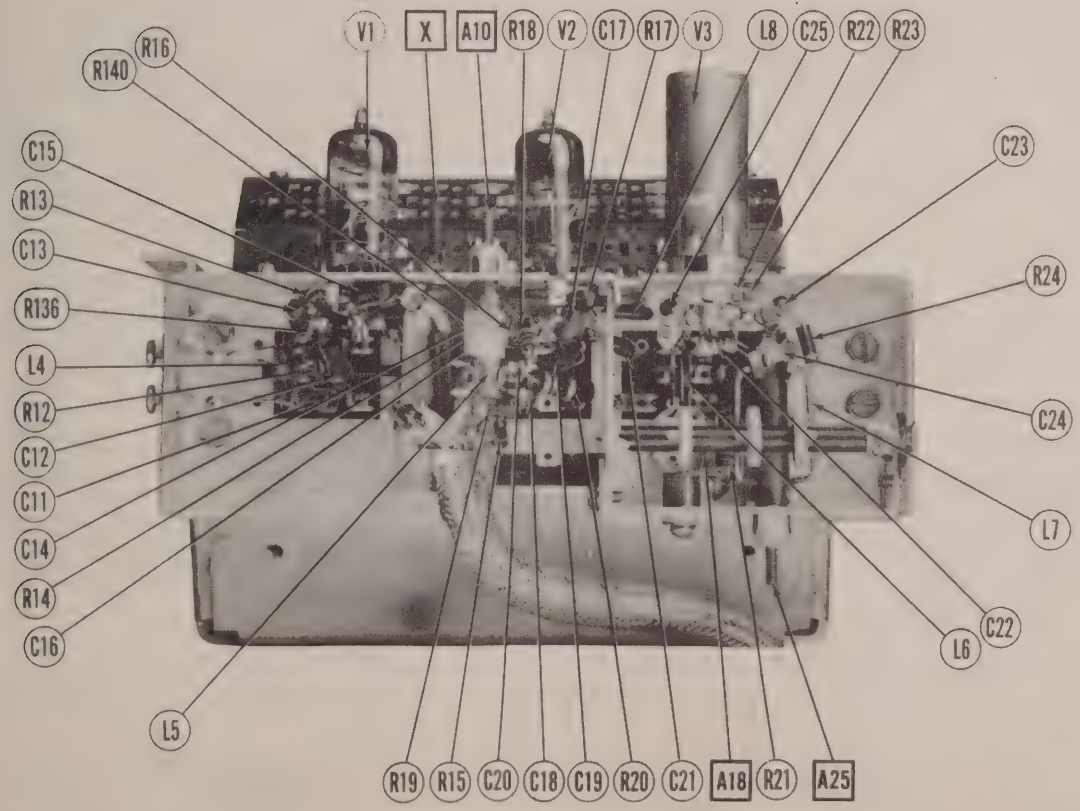
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 150Ω carbon res.	Across Antenna terminals with 150Ω resistor in each lead.	213MC (10MC Sweep)	211.25MC 215.75MC	13	Vert. Amp. to test jack "S". Low side to chassis (If scope is not calibrated use VTVM and attenuate sweep generator to give 1.5 to 2 volt reading.	A30	Keep sweep generator attenuated so scope pattern does not exceed 3 volts peak to peak. Adjust trimmer for maximum amplitude and symmetry as per Fig 7. Check to see that markers appear at proper points on the pattern.
16.	Two 150Ω carbon res.	"	207MC (10MC Sweep)	205.25MC 209.75MC	12	"	A31	"
			201MC (10MC Sweep)	199.25MC 203.75MC	11		A32	
			195MC (10MC Sweep)	193.25MC 197.75MC	10		A33	
			189MC (10MC Sweep)	187.25MC 191.75MC	9		A34	
			183MC (10MC Sweep)	181.25MC 185.75MC	8		A35	
			177MC (10MC Sweep)	175.25MC 179.75MC	7		A36	
			85MC (10MC Sweep)	83.25MC 87.75MC	6		A37	
			79MC (10MC Sweep)	77.25MC 81.75MC	5		A38	
			69MC (10MC Sweep)	67.25MC 71.75MC	4		A39	
			63MC (10MC Sweep)	65.25MC 65.75MC	3		A40	
			57MC (10MC Sweep)	55.25MC 59.75MC	2		A41	

IMPORTANT: All other adjustments in the tuner are Pre-Set at the factory and should not be adjusted in the field.

4.5 MC TRAP ADJUSTMENT

Adjustment of this trap is usually not necessary unless the unit has been tampered with or a component replaced.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT RF-VTVM	ADJUST	REMARKS
17.	5000MMF	High side to pin 7 (Grid) of 12AT7 (V7). Low side to chassis.	4.5MC (Set very accurately)	Any	RF Probe to Picture tube grid (Pin 2 of V28). Common to chassis.	A42	Turn contrast control to give 1 volt reading on RF-VTVM. Adjust A42 for minimum indication.



ZENITH MODELS
28T964R, 42T999RLP (Ch. 28F23)

RADIO ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
18	.05MFD	High side to pin 8 (Grid) of 6SB7 (V29). Low side to chassis.	455KC (400∿ Mod.)	BC	600KC	Across voice coil	A43, A44, A45, A46, A47, A48	Adjust for maximum output.
19	.05MFD	High side to pin 1 (Grid) of 6BA6 (V28). Low side to chassis.	"	AUTO	Press any button on automatic	"	A49	Adjust for MINIMUM output.
20		Loop	1600KC (400∿ Mod.)	BC	1600KC	"	A50	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
21		Loop	1400KC (400∿ Mod.)	"	1400KC	"	A51 A52	"
22	400Ω carbon res.	High side thru 400Ω to antenna terminal. Low side to chassis.	11.7MC (400∿ Mod.)	SW	11.7MC	"	A53	Adjust for maximum output.
23	"	"	"	"	"	"	A54	"
24	"	"	9.7MC (400∿ Mod.)	"	9.7MC	"	A55	Adjust for maximum output. Repeat step 23.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

For all steps of FM IF Alignment connect a 200KΩ resistor in series with the DC Probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
25	.05MFD	High side to pin 4 (Grid) of 6SH7 (V32). Low side to chassis.	8.3MC (Unmod.)	FM 45	Point of non interference	DC Probe to Point (C) Common to chassis.	A56	Adjust for maximum deflection.
26	.05MFD	"	"	"	"	DC Probe to Point (D) Common to chassis.	A57	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
27	.05MFD	High side to pin 6 (Grid) of 7W7 (V31). Low side to chassis.	"	"	"	DC Probe to Point (E) Common to chassis.	A58, A59	Adjust for maximum deflection.
28	.05MFD	High side to pin 4 (Grid) of 6SG7 (V30). Low side to chassis.	"	"	"	"	A60, A61	Solder a 300Ω 1/2 watt resistor across terminals 2 and 3 of L48 (A61). Adjust A60 and A61 for maximum deflection. Leave this resistor connected for steps 28 and 29. Remove the resistor after step 29.
29	.05MFD	High side to pin 8 (Grid) of 6SB7 (V29). Low side to chassis.	"	"	"	"	A62, A63	Adjust for maximum deflection. Remove the 300Ω resistor.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
25	.01MFD	High side to pin 8 (Grid) of 6SB7 (V29). Low side to chassis.	8.3MC (450KC Sweep)	FM 45	Point of non interference	Vert. Amp. to Point (E) Low side to chassis.	A58, A59, A60, A61, A62, A63	Adjust for maximum amplitude and symmetry as per Fig 8.
26	.01MFD	"	"	"	"	Vert. Amp. to Point (D) Low side to chassis.	A56, A57	Adjust A57 so crossover occurs at the center of the pattern as per Fig 9. Adjust A56 for maximum amplitude and straightness of cross over lines. Continue with step 30.

FM RF ALIGNMENT

Connect a 200KΩ resistor in series with the DC Probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
30	270Ω carbon res.	High side thru 270Ω to antenna terminal. Low side to chassis.	98MC (Unmod.)	FM 100	98MC	DC Probe to Point (E) Low side to chassis.	A64	Adjust for maximum deflection.
31	"	"	"	"	"	"	A65, A66	"
32	"	"	45MC (Unmod.)	FM 45	45MC	"	A67	"
33	"	"	"	"	"	"	A68, A69	"

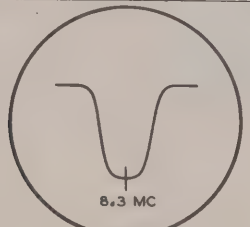


FIG. 8

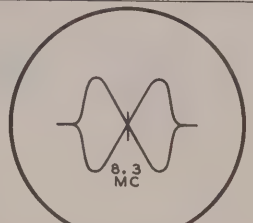
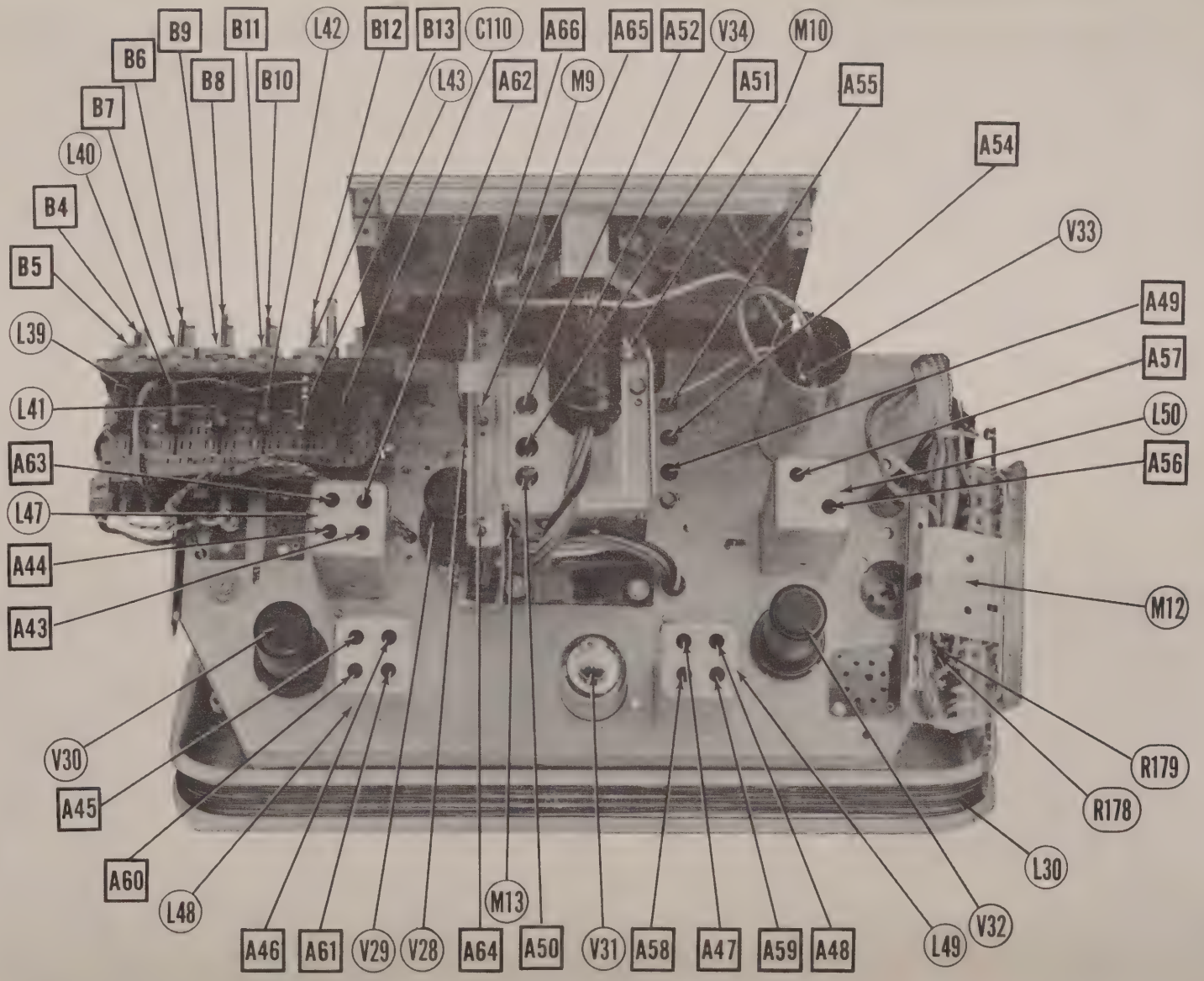
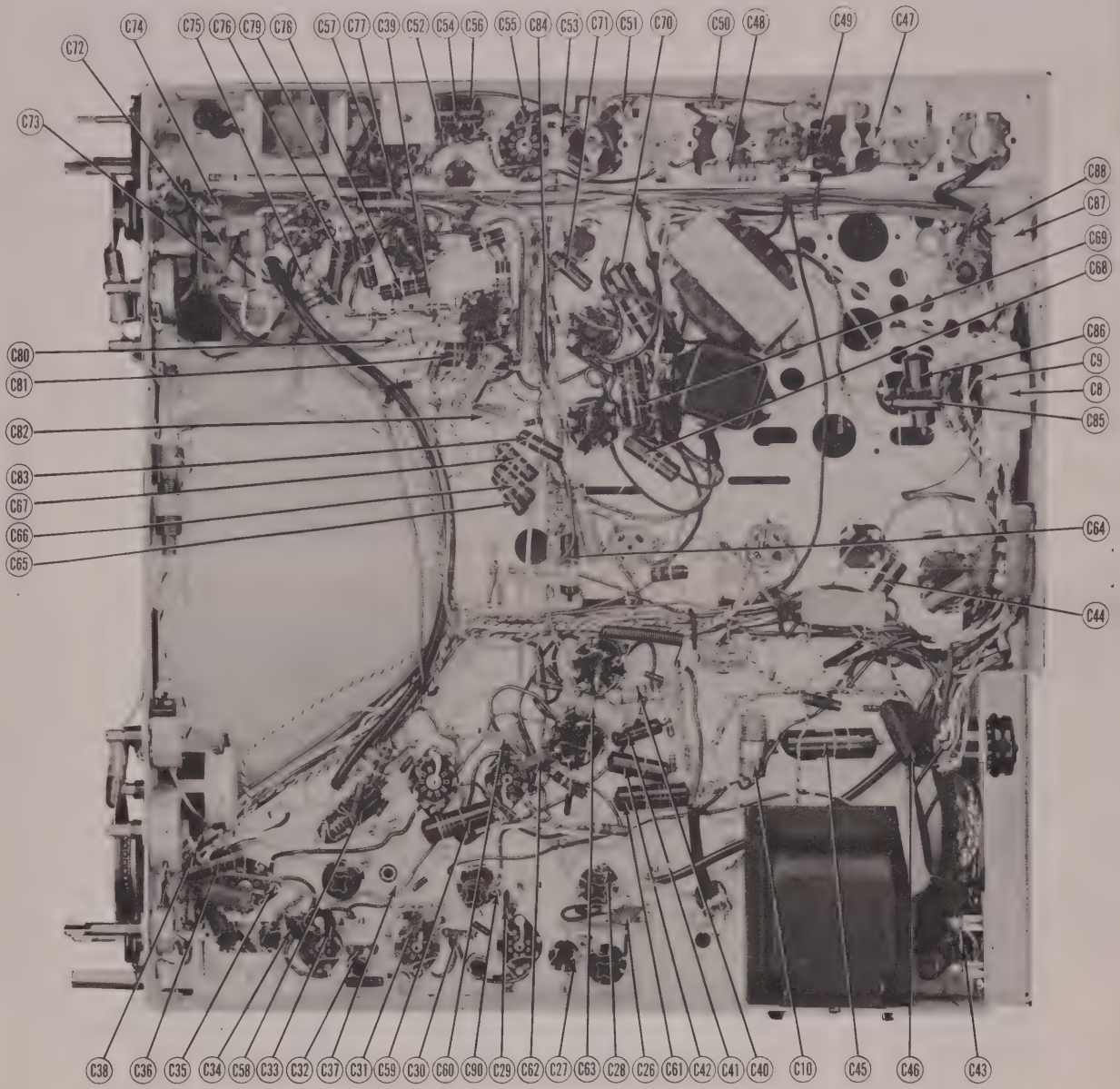


FIG. 9

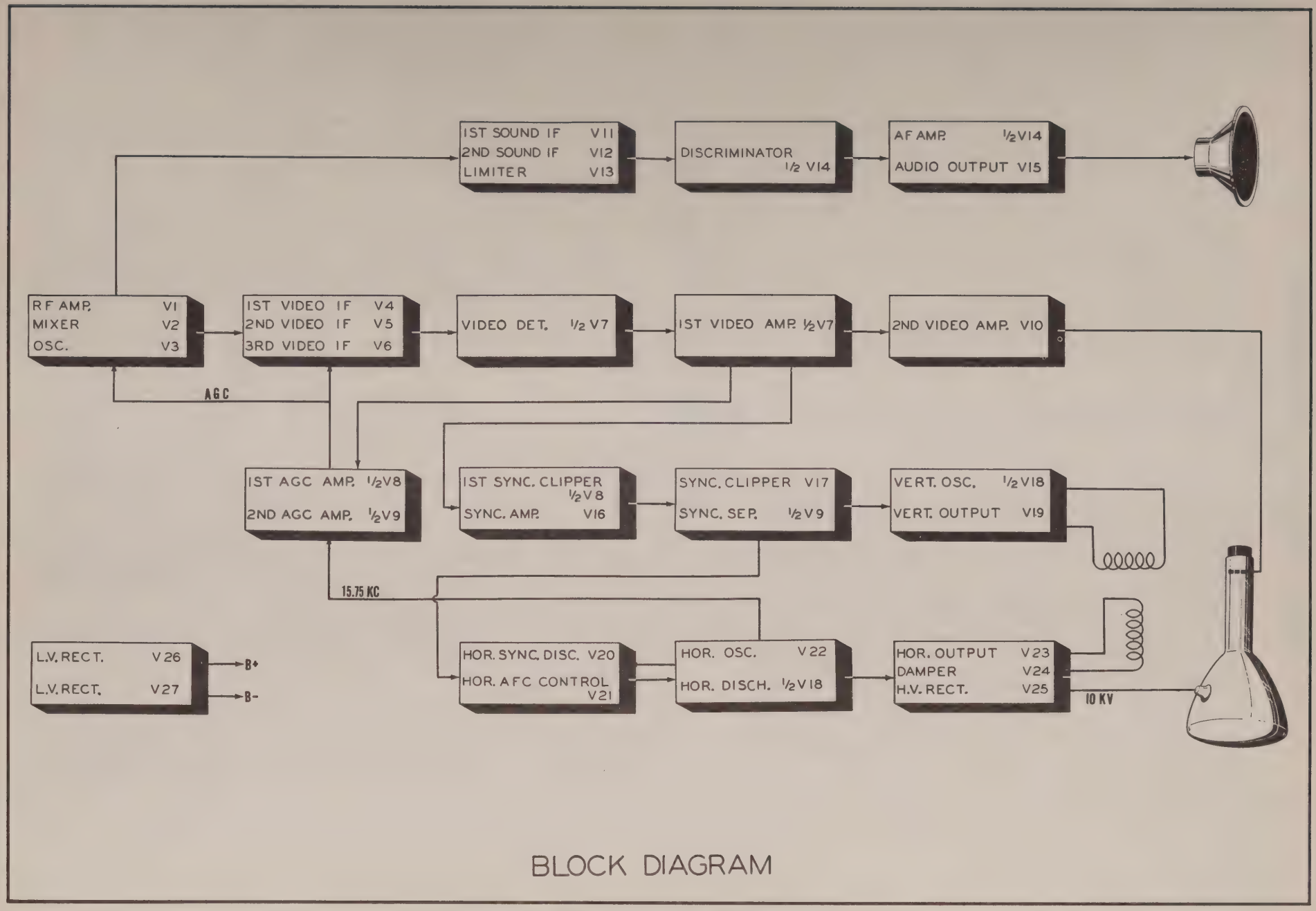


RADIO CHASSIS-TOP VIEW



CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



BLOCK DIAGRAM

PARTS LIST AND DESCRIPTIONS

TV CHASSIS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		ZENITH PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	6J6	6J6	7BF	
V4	1st Video IF Amp.	6AU6	6AU6	7BK	
V5	2nd Video IF Amp.	6AU6	6AU6	7BK	
V6	3rd Video IF Amp.	6AH6	6AH6	7BK	
V7	Video Det.-1st Video Amp.	12AT7	12AT7	9A	
V8	1st AGC Amp.-1st Sync. Clipper	12AT7	12AT7	9A	
V9	2nd AGC Amp.-Sync. Sep.	6SL7GT	6SL7GT	8BD	
V10	2nd Video Amp.	6AC7	6AC7	8N	
V11	1st Sound IF Amp.	6AU6	6AU6	7BK	
V12	2nd Sound IF Amp.	6AU6	6AU6	7BK	
V13	Limiter	6AU6	6AU6	7BK	
V14	Disc.-AF Amp.	6T8	6T8	9E	
V15	Audio Output	6V6GT	6V6GT	7AC	
V16	Sync. Amp.	6AU6	6AU6	7BK	
V17	2nd Sync. Clipper	6SH7	6SH7	8BK	
V18	Vert. Osc.-Hor. Disch.	6SN7GT	6SN7GT	8BD	
V19	Vert. Output	6V6GT	6V6GT	7AC	
V20	Hor. Sync. Disc.	6AL5	6AL5	6BT	
V21	Hor. AFC	6AC7	6AC7	8N	
V22	Hor. Osc.	6K6GT	6K6GT	7S	
V23	Hor. Output	6BG6G	6BG6G	5BT	
V24	Damper	5V4G	5V4G	5L	
V25	HV Rectifier	1B3GT	1B3GT	3C	
V26	LV Rectifier	5U4G	5U4G	5T	
V27	LV Rectifier	5U4G	5U4G	5T	
V43	Picture Tube	16AP4	16AP4		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1	15	200	22-1826	AF3G	UP2025		TVL-70	Filter
C2	40	400	22-1827	AF8J	UP7AJ274		TVL-8	Filter
C3A	20	475	22-1828	AF4X20G	UP9BJ		TVL-19	◓ Filter
B	100	300			1016			▲ Filter
C4A	20	475	22-1836	AFH4X4G8A	UP7CJ		TVL-31	◓ Decoupling
B	20	300			1014			■ Decoupling
C	40	25						▲ Output Cath. Bypass
C5A	40	450	22-2033	AFH8J4A	UP4045C		TVL-45	■ Filter
B	20	25					TVA-6	▲ Hor. Output Cath. Bypass
C6A	40	350	22-2037F	AFH8H2E	UP7BJ978		TVL-69	◓ Filter
B	10	200						▲ 1st Sync. Clipper Dec.
C7A	100	200	22-2053	AFH2X20E8B	UP8CJ10			■ Decoupling
B	10	475			31			◓ Vert. Osc. Dec.
C	40	50						▲ Vert. Output Cath. Byp.
C8	20	25	22-1903	PRS25/25	BR202A		TVA-6	Vert. Cent. Cont. Byp.
C9	500	3	22-1904	PRS6/500	BRH605		UHC-506	Hor. Cent. Cont. Byp.
C10	20	25	22-1903	PRS25/25	BR202A		TVA-6	Bias Filter
C11	200		22-1668			GP2K-200		AGC Filter
C12	200		22-1668			GP2K-200		Fixed Padder
C13	6							Fixed Trimmer †
C14	200		22-1668			GP2K-200		RF Screen Bypass
C15	1000		22-1888			GP2L-001		RF Fil. Bypass
C16	200		22-1668			GP2K-200		RF Decoupling
C17	1000		22-1888			GP2L-001		RF Bypass
C18	200		22-1668			GP2K-200		Fixed Padder
C19	200		22-1668			GP2K-200		Mixer Cath. Byp.
C20	200		22-1668			GP2K-200		Mixer Screen Byp.
C21	1.2		22-1765					Osc. Coupling
C22	10		22-1895			GP1K-10		Osc. Grid Cap.
C23	47		22-1876			GP1K-47		Osc. Grid Cap.
C24	46							Fixed Trimmer
C25	100		22-1947			GP1K-100		Osc. Fil. Bypass
C26	100	500	22-1947			GP1K-100		IF Coupling
C27	52		22-1870	1469-00005	5R5Q5		MS-45	Fixed Trimmer
C28	6		22-1869					Fixed Trimmer
C29A	1500		105-17	1467-0015	1W5D15	GP2L-0015	29C6	1st V. IF Screen Byp.
B	1500			1467-0015	1W5D15	GP2L-0015		1st V. IF Plate Dec.
C30	200		22-1668	1468-0002	5W5T2	GP2K-200	1FM-32	IF Coupling
C31A	1500		105-17	1467-0015	1W5D15	GP2L-0015	29C6	AGC Filter
B	1500			1467-0015	1W5D15	GP2L-0015		2nd V. IF Screen Byp.
C32	200		22-1668	1468-0002	5W5T2	GP2K-200	1FM-32	IF Coupling
C33A	1500		105-17	1467-0015	1W5D15	GP2L-0015	29C6	3rd V. IF Cath. Bypass
B	1500			1467-0015	1W5D15	GP2L-0015		3rd V. IF Screen Bypass
C34A	1500		105-17	1467-0015	1W5D15	GP2L-0015	29C6	RF Bypass
B	1500			1467-0015	1W5D15	GP2L-0015		3rd V. IF Plate Dec.
C35	7.5		22-1898	1468-00001	5W5Q1	NP0K-8.2	MS-41	Diode Filter
C36	.047	400	22-1775	P488-047	GT4S5		TM-15	Video Coupling
C37	1000		27-108					Fixed Trimmer
C38	1000		22-1888	1468-001	1W5D1	GP2L-001	1FM-21	V. Det. & V. Amp. Fil. Byp
C39	470	500	22-1138	1468-0005	5W5T5	GP2K-470	1FM-35	AGC Filter
C40	.001	400	22-1839	P688-001	GT6D1	GP2L-001	TM-21	AGC Filter
C41	.01	400	22-1809	P488-01	GT4S1	GP2-335-01	TM-11	AGC Filter
C42	.1	200	22-1777	P288-1	GT2P1		TM-1	AGC Filter
C43	.01	400	22-1809	P488-01	GT4S1	GP2-335-01	TM-11	AGC Filter
C44	.047	400	22-1775	P488-047	GT4S5		TM-15	Video Coupling
C45	.1	600	22-1841	P688-1	GT4P1		TM-1	Brightness Cont. Byp.

PARTS LIST AND DESCRIPTIONS (Continued)

TV CHASSIS

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C46	.03	600	22-1901	P688-03	GT6S3		TM-13	Pic. Tube Cath. Byp.
C47	.012	600	22-1880	P688-0015	GT6D2	GP2L-0015	TM-22	1st S. IF Dec.
C48	.012	600	22-1880	P688-0015	GT6D2	GP2L-0015	TM-22	2nd S. IF Dec.
C49	.047	400	22-1847	P688-0047	GT6D5	GP2M-0047	TM-25	2nd S. IF Fil. Byp.
C50	25		22-1887	1468-000025	5W5T25	GP1K-25	MS-425	Limiter Grid Filter
C51	5000		22-1706	1467-005	1D5D5	811-005	29C1	Limiter Decoupling
C52	500		22-1703	1468-0005	5W5T5	GP2K-500	1FM-35	De-emphasis
C53	3		22-1693			NPOK-3		Fixed Trimmer
C54	.0047	400	22-1811	P688-0047	GT6D5	GP2M-0047	TM-25	Audio Coupling
C55	1000		22-1886	1468-001	1W5D1	GP2L-001	1FM-21	AF Plate Bypass
C56	.022	600	22-1813	P688-022	GT6S2		TM-12	Audio Coupling
C57	.0047	600	22-1782	P688-0047	GT6D5	GP2M-0047	TM-25	Output Plate Bypass
C58	.047	600	22-1844	P688-047	GT6S5		TM-15	Video Coupling
C59	.047	600	22-1844	P688-047	GT6S5		TM-15	Sync. Coupling
C60	100	500		1468-0001	5W5T1	GP1K-100	1FM-31	RF Bypass
C61	.047	600	22-1844	P688-047	GT6S5		TM-15	Sync. Amp. Plate Dec.
C62	220	500	22-182	1468-00025	5W5T25	GP2K-220	1FM-325	Sync. Coupling
C63	.022	600	22-1845	P688-022	GT6S2		TM-12	Sync. Coupling
C64	.01	600	22-1779	P688-01	GT6S1	GP2-335-01	TM-11	Sync. Coupling
C65	.0047	400	22-1842	P688-0047	GT6D5	GP2M-0047	TM-25	Integrator Net.
C66	.0047	400	22-1842	P688-0047	GT6D5	GP2M-0047	TM-25	Integrator Net.
C67	.0047	400	22-1842	P688-0047	GT6D5	GP2M-0047	TM-25	Integrator Net.
C68	.01	600	22-1843	P688-01	GT6S1	GP2-335-01	TM-11	Vert. Osc. Grid Cap.
C69	.047	600	22-1844	P688-047	GT6S5		TM-15	Vert. Discharge
C70	.1	600	22-1841	P688-1	GT6P1		TM-1	Vert. Coupling
C71	.0022	600	22-1845	P688-0022	GT6D2	GP2M-0022	TM-22	Vert. Coupling
C72	150	500	22-1137	1468-00015	5W5T15	GP2K-150	1FM-315	Differentiator Net.
C73	470	500	22-1138	1468-0005	5W5T5	GP2K-470	1FM-35	Hor. Sync. Coupling
C74	.015	200	22-1850	P288-015				Fixed Trimmer
C75	.0047	200	22-1847	P688-0047	GT6D5	GP2M-0047	TM-25	Hor. Sync. Coupling
C76	.047	200	22-1778	P288-047	GT2S5		TM-15	AFC Filter
C77	.047	400	22-1775	P488-047	GT4S5		TM-15	Hor. AFC Screen Byp.
C78	.0047	600	22-1849	P688-0047	GT6D5	GP2M-0047	TM-25	AFC Coupling
C79	.015	200	22-1850	P288-015				Phase Shifter
C80	.0047	200	22-1847	P688-0047	GT6D5	GP2M-0047	TM-25	Hor. Osc. Grid Cap.
C81	.047	600	22-1844	P688-047	GT6S5		TM-15	Hor. Osc. Screen Byp.
C82	150	500	22-1137	1468-00015	5W5T15	GP2K-150	1FM-315	Differentiator Net.
C83	.01	400	22-1840	P488-01	GT4S1	GP2-335-01	TM-11	Differentiator Net.
C84	680	500	22-1833		1W5T7	GP2K-680	1FM-37	Hor. Discharge
C85	.001	1000	22-1851	P1088-001	GT1SD1		TR-21	Hor. Coupling
C86	.047	600	22-1844	P688-047	GT6S5		TM-15	Hor. Output Screen Byp.
C87	.1	600	22-1841	P688-1	GT6P1		TM-1	Damper Filter
C88	.1	600	22-1841	P688-1	GT6P1		TM-1	Damper Filter
C89	500	20000	22-1832					HV Filter
C90	30		22-1871				MS-43	Fixed Trimmer
C91	.0047	600	22-1782	P688-0047	GT6D5	GP2M-0047	TM-25	Line Filter §

§ Some models use 50MMF in this application.
† Not used in all models.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1	1.5Meg.	½	63-2025	Q11-138		Vert. hold control
R2	750Ω	4	63-2009	W-750 #	10-750 #	Focus control (Wire Wound)
R3	20Ω	2	63-1670	W-20X10 & S3 #		Vert. centering control tapped @ 10Ω
R4	100Ω	2	63-1669	W-100 #	43-100 #	Horiz. centering control (Wire Wound)
R5	3.5Meg.	½	63-2036			Height control
R6A	25KΩ	½	63-1675	Q11-120		Horiz. drive control
B	Shaft		Not Req.	SQ		Attach to R6A per instructions
R7A	5000Ω	½	63-1674	Q11-114	AM-19-S	Vert. linearity control
B	Shaft		Not Req.	SQ	KSS-3 #	Attach to R7A per instructions
R8A	100KΩ	½	63-1682	Q11-128	AM-49-S	Brightness control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R8A per instructions
R9A	50KΩ	½	63-1672	Q11-123	AM-44-S	Horiz. hold control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R9A per instructions
R10A	1 Meg.	½	63-1667			Volume control and SW (Dual Concentric)
B	5000Ω	½				Contrast control
R11	350Ω to 4000Ω	1	63-1690			Sensitivity control

File shaft to duplicate original.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R12	1 Meg.	½	63-1912		RF Grid
R13	47Ω	½	63-1729		RF Cathode
R14	22KΩ	½	63-1841		RF Screen Decoupling
R15	1000Ω	½	63-1785	BTS-1000	RF Decoupling
R16	2.2Meg 20%	½	63-1926		Mixer Grid
R17	820Ω	½	63-1905	BTS-820	Mixer Cathode
R18	150KΩ	½			Mixer Screen See Note 1
R19	1000Ω	½	63-1785	BTS-1000	Mixer Plate
R20	4700Ω	1	63-943	BTA-4700	Osc. Plate
R21	4700Ω	1	63-943	BTA-4700	Osc. Plate
R22	1500Ω	½	63-1792	BTS-1500	Osc. Grid
R23	47KΩ	½	63-1855		Osc. Grid
R24	10Ω	½	63-1701		Parasitic Supp.
R25	3300Ω	½	63-1806	BTS-3300	1st Video IF Grid See Note 2
R26	82Ω	½	63-1740		1st Video IF Cathode
R27	220Ω 20%	½	63-1758		1st Video IF Screen Decoupling
R28	470Ω 20%	½	63-1772	BTS-470	1st Video IF Plate Decoupling
R29	1000Ω 20%	½	63-1786	BTS-1000	AGC Network
R30	6200Ω 5%	½	63-1818		2nd Video IF Grid
R31	82Ω	½	63-1740		2nd Video IF Cathode
R32	220Ω 20%	½	63-1758		2nd Video IF Screen Decoupling
R33	4700Ω 5%	½	63-1816	BTS-4700-5%	2nd Video IF Plate

ZENITH MODELS
28T964R, 42T999RLP (Ch. 28F23)

PARTS LIST AND DESCRIPTIONS (Continued)

TV CHASSIS

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
R34	4702 20%	½	63-1772	BTS-470	2nd Video IF Plate Decoupling
R35	100Ω 20%	½	63-1751		3rd Video IF Cathode
R36	330Ω	½	63-1948		3rd Video IF Screen
R37	470Ω	½	63-1772	BTS-470	3rd Video IF Plate Decoupling
R38	39Ω	½	63-1952	BTS-39K	Peaking Coil Shunt
R39	27kΩ	½	63-1948	BTS-27K	AGC Amp. Grid
R40	3900Ω 5%	½	63-1938	BTS-3900-5%	Video Det. Diode Load
R41	2.2 Meg. 20%	½	63-1926	BTS-2.2 Meg.	Bias Voltage Divider
R42	2.2 Meg. 20%	½	63-1926	BTS-2.2 Meg.	1st Video Amp. Grid
R43	1000Ω	½	63-1786	BTS-1000	1st Video Amp. Plate
R44	470Ω	1		BTA-470	Decoupling
R45	330kΩ	½	63-1890	BTS-330K	AGC Network
R46	22kΩ	½		BTS-2200	1st AGC Amp. Cathode
R47	150kΩ	½		BTS-150K	Voltage Divider
R48	1.5 Meg. 20%	½	63-1919	BTS-1.5 Meg.	2nd AGC Amp. Plate
R49	47kΩ	½		BTS-47K	2nd AGC Amp. Plate
R50	150kΩ	½		BTS-150K	AGC Filter Network
R51	100kΩ 20%	½	63-1874	BTS-100K	AGC Filter Network
R52	47kΩ	½	63-1856	BTS-47K	AGC Filter Network
R53	470Ω 5%	½	63-1791	BTS-470-5%	Video Amp. Plate
R54	12kΩ	½	63-1881	BTS-12K	Voltage Divider See Note 4
R55	82kΩ 20%	½	63-1849	BTS-82K	Voltage Divider
R56	1 Meg. 20%	½	63-1915	BTS-1 Meg.	2nd Video Amp. Grid
R57	6800Ω	1		BTA-6800	2nd Video Amp. Screen
R58	150kΩ	½		BTS-15K	Voltage Divider See Note 4
R59	39kΩ	½	63-1852	BTS-39K	Peaking Coil Shunt
R60	62kΩ 5%	2		BT-2-6200-5%	2nd Video Amp. Plate
R61	82kΩ	½	63-1866	BTS-82K	Voltage Divider
R62	33kΩ 20%	½	63-1849	BTS-33K	Picture Tube Cathode
R63	100kΩ	½	63-1870	BTS-100K	Voltage Divider See Note 3
R64	10kΩ	½	63-1864	AB-10K	Bleeder (Wire Wound)
R65	68Ω 20%	½			1st Sound IF Cathode
R66	330Ω	½	63-1871		1st Sound IF Decoupling
R67	1kΩ	2	63-1871		2nd Sound IF Decoupling
R68	68Ω 20%	½			2nd Sound IF Cathode
R69	100Ω	½	63-1870		Limiter Grid
R70	1 Meg. 5%	½	63-1912	BTS-1 Meg.5%	Isolation
R71	47kΩ	½	63-1194		Limiter Decoupling
R72	150kΩ	½	63-1876	BTS-150K	Disc. Diode Load
R73	150kΩ	½	63-1876	BTS-150K	Disc. Diode Load
R74	10kΩ	½	63-1928	BTS-10K	De-emphasis
R75	1 Meg.	½	63-1951	BTS-15 Meg.	AF Grid
R76	22kΩ 20%	½	63-1942	BTS-22K	Tone Compensation
R77	100kΩ	½	63-1960	BTS-100K	De-emphasis
R78	220kΩ	½	63-1883	BTS-220K	AF Plate
R79	330kΩ	½	63-1940	BTS-330K	Output Grid
R80	220Ω	1	63-1227	BW-1-220	Output Cathode
R81	2.2 Meg. 5%	½	63-1926	BTS-2.2 Meg.	Voltage Divider
R82	2.2 Meg. 5%	½	63-1926	BTS-2.2 Meg.	Sync. Clipper Grid
R83	10kΩ	½	63-1828	BTS-10K	Sync. Clipper Plate
R84	33kΩ	½	63-1849	BTS-33K	Sync. Clipper Plate
R85	33kΩ	½	63-1827	BTS-15K	Voltage Divider
R86	2.2 Meg. 20%	½	63-1926	BTS-2.2 Meg.	Sync. Amp. Grid
R87	2.2 Meg. 20%	½	63-1926	BTS-2.2 Meg.	Voltage Divider See Note 4
R88	10kΩ 5%	1	63-1871	BTA-10K 5%	Sync. Amp. Plate
R89	10kΩ 5%	1	63-1871	BTA-10K-5%	Sync. Amp. Plate Decoupling
R90	1 Meg. 20%	½	63-1938	BTS-1 Meg.	2nd Sync. Clipper Grid
R91	12kΩ	½	63-1881	BTS-12K	2nd Sync. Clipper Plate
R92	1 Meg. 20%	½	63-1912	BTS-1 Meg.	Sync. Sep. Grid
R93	2.2 Meg. 20%	½	63-1926	BTS-2.2 Meg.	Voltage Divider
R94	10kΩ	½	63-1827	BTS-10K	Sync. Sep. Plate
R95	820kΩ	½	63-1824	BTS-8200	Sync. Sep. Plate
R96	820kΩ	½	63-1824	BTS-8200	Integrator
R97	820kΩ	½	63-1824	BTS-8200	Integrator
R98	820kΩ	½	63-1824	BTS-8200	Integrator
R99	1 Meg. 5%	½	63-1912	BTS-1 Meg.5%	Vert. Osc. Grid
R100	220kΩ	½	63-1884	BTS-220K	Vert. Osc. Plate
R101	8200Ω	½	63-1824	BTS-8200	Vert. Peaking
R102	1.5 Meg.	½	63-1919	BTS-1.5 Meg.	Vert. Output Grid
R103	1500Ω	1	63-1967	BTA-1500	Vert. Output Cathode
R104	6800Ω	½		BTS-6800	Bias Network
R105	3300Ω	½		BTS-3300	Bias Network
R106	2700Ω	2	63-1169	BW-2-2700	Filter
R107	47kΩ	½	63-1896	BTS-470K	Horiz. Sync. Disc. Load
R108	47kΩ	½	63-1896	BTS-470K	" " "
R109	47kΩ	½	63-1896	BTS-470K	Horiz. AFC Filter
R110	560Ω	½	63-1775	BTS-560	Horiz. AFC Grid
R111	6800Ω	½		BTS-6800	Feedback Network
R112	10Ω	½	63-1701	BW-½-10	Horiz. AFC Cathode
R113	2200Ω	2		BT-2-222K	Horiz. AFC Plate
R114	39kΩ	½	63-1852	BTS-39K	Horiz. AFC Screen
R115	56kΩ	½		BTS-56K	Voltage Divider
R116	27kΩ	2		BT-2-27K	Bleeder
R117	4700Ω	5		AB-4000	Filter (Wire Wound) See Note 6
R118	27kΩ	½	63-1845	BTS-27K)	Horiz. Osc. Grid
R119	10kΩ	1	63-1071	BTA-10K	Horiz. Osc. Screen
R120	5600Ω	10	63-1833	AB-5000	Horiz. Osc. Plate (Wire Wound)
R121	18kΩ	½		BTS-18K	Differentiator
R122	33kΩ	2		BT-2-33K	Bleeder
R123	220kΩ 20%	½		BTS-220K	Horiz. Discharge Grid
R124	560kΩ	½		BTS-560K	Horiz. Discharge Plate
R125	8200Ω	½	63-1824	BTS-8200	Horiz. Peaking
R126	150Ω	½	63-1751		Parasitic Supp.
R127	47kΩ	½	63-1896	BTS-470K	Horiz. Output Grid
R128	180Ω	2	63-1875	BW-2-180	Horiz. Output Cathode
R129	16kΩ	2	63-1196	BT-2-16K	Horiz. Output Screen
R130	15kΩ	20	63-1679	DG-15K	Damper Filter (Wire Wound)
R131	4.7Ω	1	63-1581		HV Rect. Filament

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Zenith PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
R132	3000Ω	10	63-2011	AB-3000	Filter (Wire Wound)
R133	470kΩ	1	63-1898		HV Filter
R134	620Ω	10	63-1685	AB-600	Focus Coil Shunt
R135	10Ω	2		BW-2-10	Bias Network (Wire Wound)
R136	10Ω	½	63-1701		Parasitic Supp. See Note 4
R137	180Ω	½		BW-½-180	Sync. Amp. Cathode See Note 4
R138	680Ω	½		BW-½-680	Sync. Amp. Cathode See Note 4
R139	47kΩ	½	63-1856	BTS-47K	Filter
R140	10Ω	½	63-1701		Parasitic Supp. See Note 4
R141	1600Ω	½		BTS-1800	Vert. Output Plate See Note 4
R142	5600Ω	½		BTS-5600	Vert. Output Plate See Note 4
R143	33Ω	2		BW-2-33	Filter (Wire Wound) See Note 5
R144	100kΩ	½	63-1869	BTS-100K	Line Filter See Note 4
R145	100kΩ	½	63-1869	BTS-100K	Line Filter See Note 4

Note 1. Some models use 680KΩ resistor in this application.
Note 2. Some models use 6200Ω resistor in this application.
Note 3. Some models use 120KΩ resistor in this application.
Note 4. Not used in all models.
Note 5. Used only in filter system on S15747 power supply.
Note 6. Some models use 2500Ω 5 watt resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.
T1	117VAC ② 2.1A	810VCT .17ADC 660VCT .195ADC	5VAC ③ 3A	5VAC ③ 5A	95-1124			TP-390 ②

② Mount vertically with universal mounting brackets.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.
T3	117VAC ② .70A	5VAC ② 2A SEC. 4 6.3VAC ② 4.1A	6.3VAC ③ .6A	6.3VAC ③ 5A	95-1116			

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	NOTES
T4	672 CT	580 Tap ⑤ 15Ω	S-15041				Hor.Osc.-AFC Trans.
T5	572	2000	95-1113	A-8121	A-4000	TSO-1	Vert.Block Osc.Trans
T6	370Ω Tap ⑥ @ 85Ω	SEC. 1 4.5Ω Tap ⑤ .35Ω SEC. 2 0Ω	S-15709			TFB-3	Hor.Output Trans.
T7	590Ω	142	95-1112	A-8115 ①	A-3035 ①	TSO-5	Vert.Output Trans.
T8A	142		95-1110	DY-1			Hor.Deflection Coil
B	600						Vert.Deflection Coil
T9	550Ω		95-1147				Focus Coil

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
T10	5300Ω	3.4Ω	590Ω	.6Ω	95-1114	A-3849	A-2902	RO-9 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS FIELD RES.	RATINGS V. C. IMP.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	PM	3.4Ω	49-661	ST-102 ④⑤ MDD.F12-8	12A6A ⑤	④ Replace output trans. to match 6-8Ω voice coil. ⑤ Fabricate mounting brackets to duplicate original.
	CONE DIA.	V. C. DIA.				
SP2	12"	1"	208-600			

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
L1	.170A	135Ω	5 Henries	95-1109	C-2325 ‡‡	C-2974	TR-4200 ‡‡	‡‡ Drill one new mounting hole.
L2	.195A	108Ω	3 Henries	95-1154	C-2325 ‡‡	C-2974	TR-4200 ‡‡	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L4	Ant. Input	0Ω		S-15062		
L5	Mixer Plate	.5Ω		S-15064		
L6	High Freq. Osc.	0Ω		S-15043		
L7	Low Freq. Osc.	0Ω		S-15066		
L8	Fil.Choke	.1Ω		S-15065		
L9	1st Video IF	0Ω	0Ω	S-15048		
L10	Sound IF Trap	.2Ω		S-15050		
L11A	Video IF Coupling	.2Ω		S-15049		Used in narrow band IF sets only. On wide band IF sets L11B is used in this application.
L11B	Adjacent Sound IF			S-15727		
L12	2nd Video IF	.1Ω		S-15051		
L13	Adjacent Sound IF Trap	0Ω		S-15053		
L14	3rd Video IF	.1Ω		S-15052		
L15	4th Video IF	.1Ω	.1Ω	S-15054		
L16	Sound IF Trap	0Ω		S-15057		
L17	Peaking	5Ω		S-15058		
L18	Peaking	7Ω		S-15059		
L19	Fil. Choke	.1Ω		S-15060		
L20	RF Choke	1.5Ω		S-15128		
L21	Peaking	2Ω		S-15125		
L22	Peaking	8Ω		S-15127		
L23	Peaking	6Ω		S-15126		
L24	1st Sound IF	.2Ω		95-1121		
L25	2nd Sound IF	.1Ω	.1Ω	95-1118		
L26	3rd Sound IF	.1Ω	.1Ω	95-1119		
L27	Disc. Trans.	.1Ω	.1Ω	95-1120		
L28	Width Cont.	.3Ω		S-15042		
L29	Fil. Choke	.1Ω		20-256		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA	NOTES
M1	Bayonet	6-8	.25	Blue	100-36		Type #44
M2	Bayonet	6-8	.25	Blue	100-36		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Tuner Assembly	S-15020	
M4	Channel Strip Assy.	S-15029	Channel #2-Channel number is stamped on each strip.
		S-15030	Channel #3
		S-15031	Channel #4
		S-15032	Channel #5
		S-15033	Channel #6
		S-15034	Channel #7
		S-15035	Channel #8
		S-15036	Channel #9
		S-15037	Channel #10
		S-15038	Channel #11
		S-15039	Channel #12
		S-15040	Channel #13
M5	Focus Range SW	85-238	
M6	Dial Light Switch	85-448	
M7	Ion Trap	S-15320	
M8	Fuse	136-16	.25A

ZENITH MODELS
28T964R, 42T999RLP (Ch. 28F23)

PARTS LIST AND DESCRIPTIONS
RADIO CHASSIS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V28	RF Amp.	6BA6	6BA6	7BK	
V29	Converter	6SB7	6SB7	8R	
V30	1st IF Amp.	6SG7	6SG7	8BK	
V31	2nd IF Amp.	7W7	7W7	8BJ	
V32	Limiter	6SH7	6SH7	8BK	
V33	Disc.-Det.-AVC-AF Amp.	6S8GT	6S8GT	8CB	
V34	Tuning Indicator	6AL7GT	6AL7GT	8CH	
V35	Phono Pre-Amp.	6J5	6J5	6Q	
V36	Phono Pre-Amp.-Osc.	7F7	7F7	8AC	
V37	Phase Inv.	6J5	6J5	6Q	
V38	Power Output	6V6GT	6V6GT	7AC	
V39	Power Output	6V6GT	6V6GT	7AC	
V40	Power Output	6V6GT	6V6GT	7AC	
V41	Power Output	6V6GT	6V6GT	7AC	
V42	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C92A	15	450	22-1515	AFH63J	UP1111		EL-300*	▲ Filter
B	30	450			45*			▲ Filter
C93A	15	450	22-1515	AFH63J	UP1111		EL-300*	▲ Filter
B	30	450			45*			▲ Filter
C94	30	300	22-1449	AF6J	UP3035		EL-33	Decoupling
C95	100	500	22-162	1468-0001	5W5T1	GP1K-100	1FM-31	FM Ant. Coupling
C96	25		22-1507	1468-000025	5W5Q25	GP1K-25	MS-425	FM Ant. Coupling
C97	22		22-1506			GP1K-22		Fixed Trimmer
C98	10		22-1504	1468-00001	5W5Q1	GP1K-10	MS-41	SW Ant. Coupling
C99	150	300	22-1503	1468-00015	5W5T15	GP2K-150	1FM-315	AVC Filter
C100	.05	200	22-829	P288-05	GT2S5		TM-15	AVC Filter
C101	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	RF Screen Bypass
C102	17		22-1505					Fixed Trimmer
C103	50		22-1367	1468-00005	5W5Q5	GP1K-50	1FM-45	RF Plate Decoupling
C104	35		22-1508	1468-00004	5W5Q4	GP1K-33	1FM-44	RF Coupling
C105	5	500		1468-000005	5W5V5	NPOK-5	MS-55	RF Coupling
C106	.002	600	22-912	P688-002	GT6D2	GP2M-002	TM-22	Isolation †
C107	50		22-1367	1468-00005	5W5Q5		1FM-45	Osc. Grid Cap.
C108	52		22-1509					Fixed Trimmer
C109	52		22-1509					Fixed Trimmer
C110	480	500	22-868					Fixed Trimmer
C111	1000	500	22-1169	1468-001	1W5D1	GP2L-001	1FM-21	Osc. Anode Bypass
C112	475							Conv. Fil. Bypass
C113	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	Conv. Plate Dec.
C114	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	RF Bypass
C115	.02	200	22-1386	P488-02	GT2S2		TM-12	AVC Filter
C116	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	1st IF Screen Byp.
C117	.05	200	22-829	P288-05	GT2S5		TM-15	1st IF Fil. Byp.
C118	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	1st IF Plate Dec.
C119	.05	200	22-829	P288-05	GT2S5		TM-15	2nd IF Grid Filter
C120	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	2nd IF Screen Bypass
C121	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	2nd IF Plate Dec.
C122	100	500	22-162	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C123	50		22-1367	1468-00005	5W5Q5	GP1K-50	1FM-45	Limiter Grid Filter
C124	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	Limiter Screen Bypass
C125	.02	600	22-830	P688-02	GT6S2		TM-12	Limiter Plate Dec.
C126	500	500	22-1138	1468-0005	5W5T5	GP2K-500	1FM-35	De-emphasis
C127	.05	200	22-829	P288-05	GT2S5		TM-15	RF Bypass
C128	.02	400	22-188	P488-02	GT4S2		TM-12	Audio Coupling
C129	100		22-289	1468-0001	5W5T1	GP1K-100	1FM-31	Tone Comp. §
C130	.002	600	22-912	P688-002	GT6D2	GP2M-002	TM-22	Tone Comp. ♦
C131	.02	400	22-1127	P488-02	GT4S2		TM-12	Tone Comp. †
C132	.005	600	22-1041	P688-005	GT6D5	GP2M-005	TM-25	Tone Comp.
C133	.004	600	22-1362	P688-004	GT6D4		TM-24	Tone Comp.
C134	.002	600	22-912	P688-002	GT6D2	GP2M-002	TM-22	Tone Comp.
C135	.004	600	22-1362	P688-004	GT6D4		TM-24	Audio Coupling
C136	100	500	22-365	1468-0001	5W5T1	GP1K-100	1FM-31	AF Grid Bypass
C137	.05	600	22-171	P688-05	GT6S5		TM-15	AF Plate Dec.
C138	.02	600	22-830	P688-02	GT6S2		TM-12	Audio Coupling
C139	500	500	22-1138	1468-0005	5W5T5	GP2K-500	1FM-35	AF Plate Bypass
C140	.005	600	22-1041	P688-005	GT6D5	GP2M-005	TM-25	Tuning Ind. Filter
C141	.01	600	22-196	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C142	.0068	400	22-1041	P488-0068	GT6D6	GP2-334-0068	TM-26	Line Filter
C143	.01	400	22-1126	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C144	.02	400	22-188	P488-02	GT4S2		TM-12	Osc. Grid Cap.
C145	50		22-1367	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Feedback
C146	50	500	22-289	1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Feedback
C147	.002	600	22-912	P688-002	GT6D2	GP2M-002	TM-22	Audio Coupling
C148	100	500	22-162	1468-0001	5W5T1	GP1K-100	1FM-31	Pre-Amp Grid Bypass
C149	.02	600	22-1128	P688-02	GT6S2		TM-12	Audio Coupling
C150	.002	1000	22-1134	P1088-002	GT16D2		MB-22	Output Plate Bypass

* Parallel sections to obtain desired capacity.
† Not used in all models.
§ Some models use 50MMF in this application.
♦ Some models use .01MFD in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R146	2.5Meg.	½	63-1349			Volume control and switch, tapped a 500KΩ and 1 Meg.

PARTS LIST AND DESCRIPTIONS (Continued)

RADIO CHASSIS

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	
R147	15KΩ	½	63-503	BTS-15K	Ant. Isolation
R148	100KΩ	½	63-715	BTS-100K	AVC Network
R149	33KΩ	½	63-1166	BTS-33K	RF Screen
R150	5600Ω	½	63-1448	BTS-5600	RF Plate
R151	47KΩ	½	63-593	BTS-47K	Conv. Grid
R152	1000Ω	½	63-380	BTS-1000	Conv. Decoupling
R153	220Ω	½	63-579		Parasitic Supp.
R154	120Ω	½	63-626	BW-½-120	Conv. Cathode
R155	33KΩ	½	63-712	BTS-33K	Osc. Grid
R156	18KΩ	2	63-510	BT-2-18K	Osc. Anode
R157	100KΩ	½	63-595	BTS-100K	AVC Network
R158	2.2 Meg.	½	63-600	BTS-2.2 Meg.	AVC Network
R159	68KΩ	½	63-960	BTS-68K	1st IF Screen
R160	1200Ω	½	63-1446	BTS-1200	1st IF Plate Decoupling
R161	2200Ω	½	63-585	BTS-2200	Tone Compensation
R162	33KΩ	½	63-592	BTS-33K	AVC Network
R163	120KΩ	½	63-1447	BTS-120K	2nd IF Screen
R164	2200Ω	½	63-803	BTS-2200	2nd IF Plate Decoupling
R165	33KΩ	½	63-592	BTS-33K	Diode Filter
R166	220KΩ	½	63-296	BTS-220K	Diode Load
R167	47KΩ	½	63-593	BTS-47K	Limiter Grid
R168	100KΩ	1	63-380	BTA-100K	Limiter Screen
R169	100KΩ	1	63-380	BTA-100K	Limiter Plate Decoupling
R170	33KΩ	½	63-592	BTS-33K	Voltage Divider
R171	100KΩ	½	63-260	BTS-100K	Disc. Diode Load
R172	100KΩ	½	63-260	BTS-100K	Disc. Diode Load
R173	100KΩ	½	63-260	BTS-100K	De-emphasis
R174	15 Meg.	½	63-503	BTS-15 Meg.	AF Grid
R175	220KΩ	½	63-296	BTS-220K	AF Plate
R176	100KΩ	½	63-595	BTS-100K	AF Plate Decoupling
R177	82KΩ	½	63-651	BTS-82K	Tone Compensation
R178	68KΩ	½	63-960	BTS-68K	Tone Compensation See Note 7
R179	220KΩ	½	63-296	BTS-220K	Tone Compensation See Note 4
R180	3300Ω	½	63-586	BTS-3300	Tuning Eye Grid
R181	2.2 Meg.	½	63-600	BTS-2.2 Meg.	Tuning Eye Network
R182	33Ω	½	63-620	BW-½-33	Bias Network
R183	1 Meg.	½	63-441	BTS-1 Meg.	Phono Pre Amp. Grid
R184	2200Ω	½	63-803	BTS-2200	Phono Pre Amp. Cathode
R185	47KΩ	½	63-593	BTS-47K	Phono Pre Amp. Plate
R186	330KΩ	½	63-776	BTS-330K	Tone Compensation
R187	1 Meg.	½	63-441	BTS-1 Meg.	Phono Osc. Grid
R188	47KΩ	½	63-593	BTS-47K	Phono Osc. Plate
R189	5600Ω	½	63-1448	BTS-5600	Phono Osc. Plate
R190	15 Meg.	½	63-503	BTS-15 Meg.	Phono Pre Amp. Grid
R191	470KΩ	½		BTS-470K	Phono Pre Amp. Plate
R192	33KΩ	½	63-592	BTS-33K	Phono Pre Amp. Plate Decoupling
R193	2200Ω	½	63-797	BTS-2200	Phase Inv. Cathode
R194	33KΩ	½	63-1848	BTS-33K	Phase Inv. Grid
R195	47KΩ	½	63-648	BTS-47K	Phase Inv. Plate
R196	220KΩ	½	63-1883	BTS-220K	Output Grid
R197	100Ω	½	63-577		Parasitic Supp.
R198	100Ω	½	63-577		Parasitic Supp.
R199	180KΩ	½	63-1880	BTS-180K	Output Grid
R200	100Ω	½	63-577		Parasitic Supp.
R201	100Ω	½	63-577		Parasitic Supp.
R202A	75Ω	10	63-1551	AB-75	Output Cathode (Wire Wound)
B	1000Ω	10		AB-1000	Filter

Note 4. Not used in all models.
Note 7. Some models use 15KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T2	117VAC @ 1.45A	700VCT .215ADC	5VAC @ 3A	6.3VAC @ 5A	95-956	P-6314 ②	P-3155 ①③	PV-200 ③

① Drill new mounting holes.
② Mount vertically with universal mounting brackets.
③ Add series resistor to reduce plate voltage.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T11	5.1KΩ CT	3.4Ω	270Ω CT	.3Ω	206-600		A-2935		

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	ZENITH PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L3	.215A	100Ω	3 Henries	95-957	C-2325 ‡‡	C-2974	TR-4200 ‡‡	‡‡ Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	
L30	AM Loop Ant.	1.5Ω	1.5Ω	S-13673		Complete
L31	AM Ant. Loading	2.3Ω		S-12529		
L32	FM Ant.	0Ω	0Ω	S-12301		

PARTS LIST AND DESCRIPTIONS (Continued)

RADIO CHASSIS

COILS (RF-IF) CONT.

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L33	SW Ant.	0Ω		S-12282		
L34	FM RF	0Ω	0Ω	S-12302		
L35	RF Choke	.1Ω				
L36	SW RF	0Ω		S-12291		
L37	Wave Trap	40Ω		S-12281		
L38	AM RF	4Ω	8Ω	S-12293		
L39	Auto Tuning	1.5Ω		S-7021		Yellow } Complete unit replaced
L40	Auto Tuning	2.1Ω		S-6928		Red } under part number S-12331.
L41	Auto Tuning	3Ω		S-6929		Green }
L42	Auto Tuning	3Ω		S-7859		Blue }
L43	Auto Tuning	3Ω		S-10100		White }
L44	FM Osc.	0Ω	0Ω	S-12303		
L45	SW Osc.	0Ω		S-12292		
L46	AM Osc.	9.6Ω	12Ω	S-11344		Automatic Osc. section resistance 1.5Ω
L47	1st IF } FM	.6Ω	.6Ω	S-12249		
	Trans. } AM	9Ω	8.6Ω			
L48	2nd IF } FM	.7Ω		S-12250		
	Trans. } AM	8.3Ω	7.5Ω			
L49	3rd IF } FM		.6Ω	S-12251		
	Trans. } AM	8Ω	7Ω			
L50	Disc.Trans.	1.2Ω	1.3Ω	S-12252		
L51	Line Choke	0Ω		S-12256		
L52	FM Dipole and SW Assembly	0Ω		S-13058		
L53	Phono Osc. Grid Coil	2.5Ω				

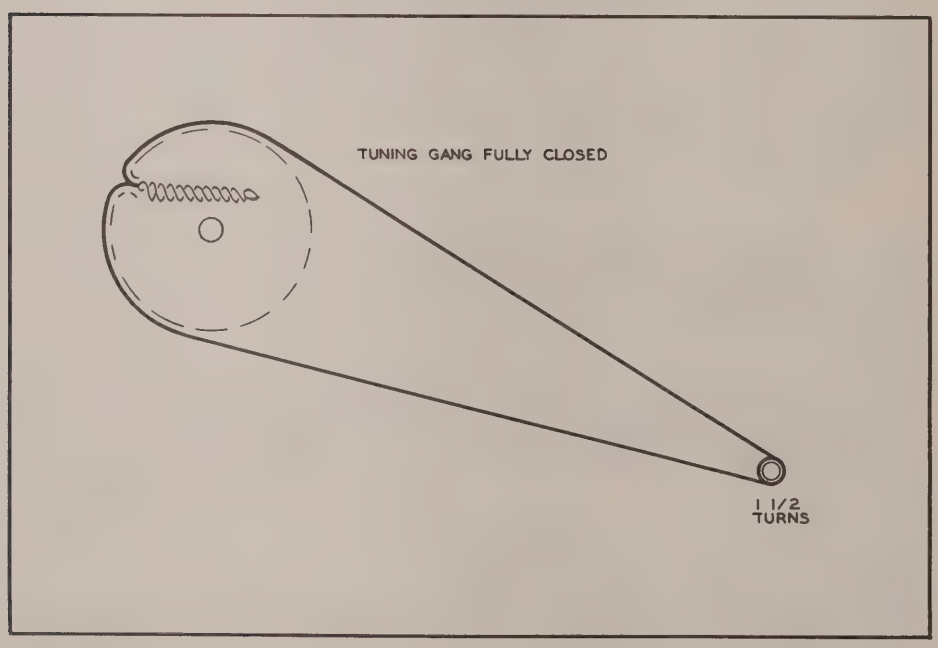
MISCELLANEOUS

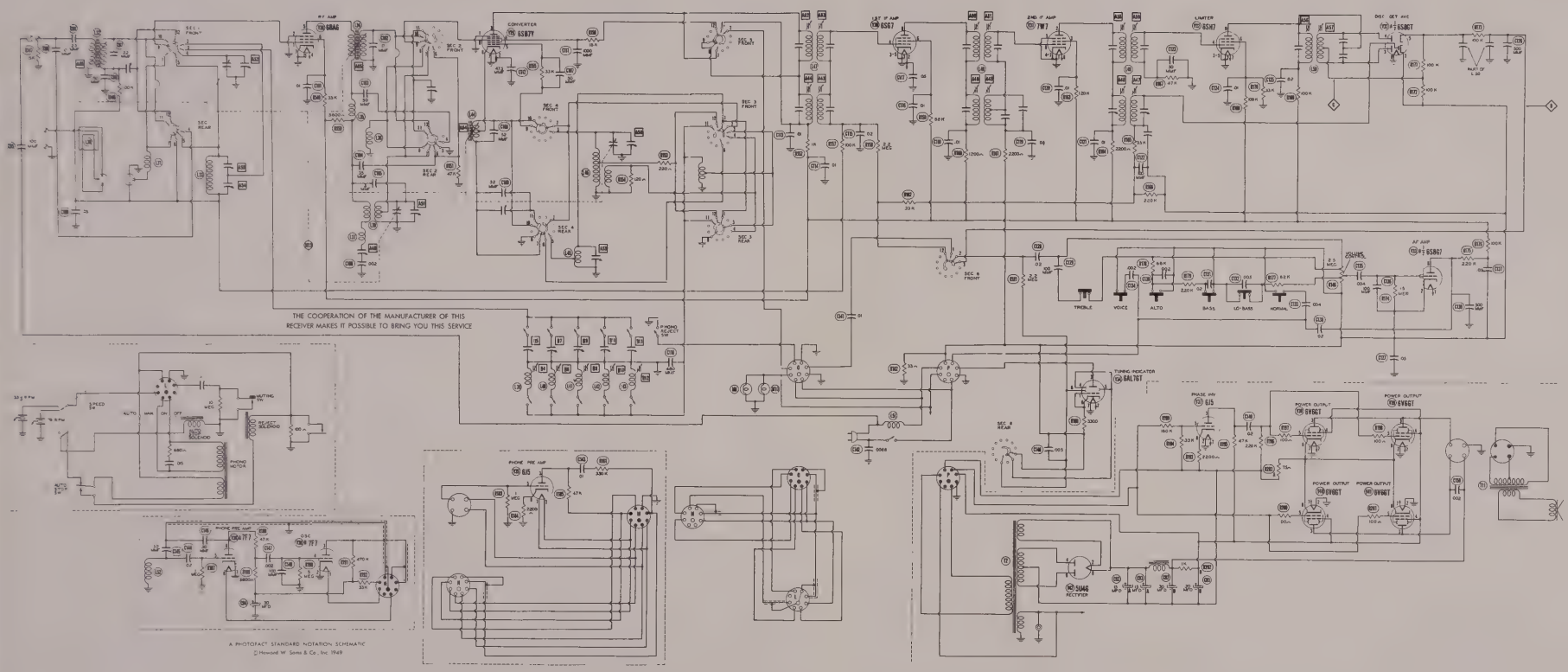
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M11	Band Switch	S-12356	Includes shield assembly
M12	Radiorgan Assembly		
M13	Tuning Cap	22-1363	(24-500MMF, 17-215MMF, 16-90MMF W/T)
	Knob	46-674	Automatic Station Selector (5 used)
	Knob	46-681	Phono Reject Knob
	Automatic Tuning Unit SW	85-370	Switch only
	Knob	S-13472	Knob and eyelet assembly. Normal
	Knob	S-13475	Knob and eyelet assembly. Alto
	Knob	S-13476	Knob and eyelet assembly. Voice
	Knob	S-13668	Knob and eyelet assembly. Low Bass
	Knob	S-13669	Knob and eyelet assembly. Bass
	Knob	S-13670	Knob and eyelet assembly. Treble
	Radiorgan Strip and Contact Assy.	S-9606	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA	NOTES
M9	Bayonet	6-8V	.25	Blue	100-36		Type #44
M10	Bayonet	6-8V	.25	Blue	100-36		Type #44

DIAL CORD STRINGING




THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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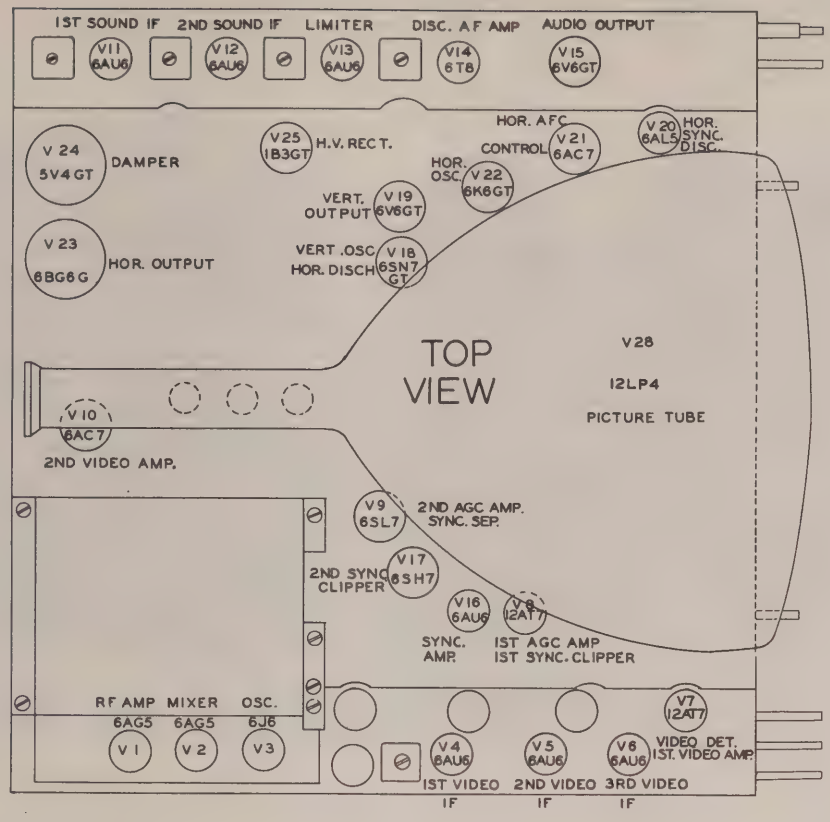
VOLTAGE MEASUREMENTS

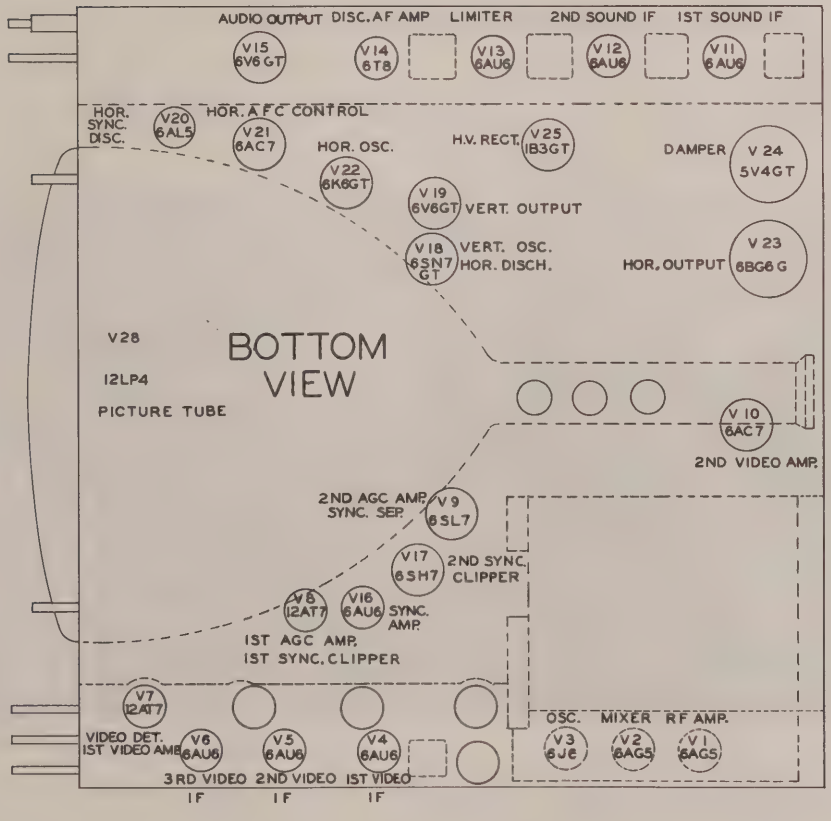
VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
	V 1	6AG5	-.2VDC	.3VDC	6.3VAC	0V	200VDC	190VDC	.3VDC		
	V 2	6AG5	-.2VDC	1.7VDC	6.3VAC	0V	225VDC	140VDC	1.7VDC		
	V 3	6J6	♦165VDC	◓95VDC	6.3VAC	0V	§-4VDC	§-4.7VDC	0V		
	V 4	6AU6	-1.2VDC	0V	6.3VAC	0V	240VDC	140VDC	.2VDC		
	V 5	6AU6	-1.7VDC	0V	6.3VAC	0V	220VDC	140VDC	.2VDC		
	V 6	6AH6	0V	0V	6.3VAC	0V	225VDC	150VDC	1.6VDC		
	V 7	12AT7	-.9VDC	-.9VDC	0V	0V	0V	80VDC	0V	0V	6.3VAC
	V 8	12AT7	140VDC	-1.3VDC	2.1VDC	6.3VAC	6.3VAC	45VDC	-2VDC	0V	0V
	V 9	6SL7GT	.3VDC 2.5VDC	-2.6VDC	2.1VDC	-1.2VDC	212VDC	0V	6.3VAC	0V	
	V 10	6AC7	0V	0V	0V	-.2VDC	0V	82VDC	6.3VAC	180VDC	
	V 11	6AU6	0V	0V	6.3VAC	0V	155VDC	155VDC	.8VDC		
	V 12	6AU6	0V	0V	6.3VAC	0V	150VDC	150VDC	.8VDC		
	V 13	6AU6	-.4VDC	0V	6.3VAC	0V	55VDC	55VDC	0V		
	V 14	6T8	-.8VDC	-.8VDC	1.7VDC	0V	6.3VAC	0V	0V	-.8VDC	90VDC
	V 15	6V6GT	0V	6.3VAC	225VDC	250VDC	0V	0V	0V	11VDC	
	V 16	6AU6	.2VDC	0V	0V	6.3VAC	140VDC	187VDC	7VDC		
	V 17	6SH7	0V	0V	0V	-1.2VDC	0V	187VDC	6.3VAC	100VDC	
	V 18	6SN7GT	-6.5VDC	150VDC 400VDC	0V	-20VDC	55VDC	0V	0V	6.3VAC	
	V 19	6V6GT	0V	0V	335VDC	335VDC	0V	0V	6.3VAC	25VDC 40VDC	
	V 20	6AL5	-2.2VDC	-9VDC	0V	6.3VAC	-1VDC	0V	-4.8VDC		
	V 21	6AC7	0V	0V	0V	-.5VDC	0V	115VDC	6.3VAC	130VDC	
	V 22	6K6GT	0V	0V	160VDC	175VDC	-19VDC	380VDC	6.3VAC	.3VDC	
	V 23	6BG6G	0V	6.3VAC	14.5VDC	6.3VAC	-2VDC	-2VDC	0V	250VDC	TOP CAP *
	V 24	5V4G	0V	450VDC	440VDC	380VDC	0V	380VDC	450VDC	450VDC	
	V 25	1B3GT	* DO NOT MEASURE								
	V 26	5U4G	0V	330VDC	0V	310VAC	0V	310VAC	0V	330VDC	
	V 27	5U4G	0V	410VDC	0V	380VAC	300VDC	380VAC	320VDC	410VDC	
	V 28	6BA6	-1.5VDC	0V	0V	6.3VAC	167VDC	112VDC	0V		
	V29A	6SB7Y	0V	6.3VAC	250VDC	87VDC	§-1VDC	0V	0V	0V	
‡	V29B	6SB7Y	0V	6.3VAC	250VDC	90VDC	§-1.3VDC	0V	0V	0V	
	V30	6SG7	0V	6.3VAC	0V	-.6VDC	0V	97VDC	0V	260VDC	
	V31	7W7	0V	260VDC	87VDC	0V	0V	-1.5VDC	0V	6.3VAC	
	V32	6SH7	0V	0V	0V	-.4VDC	0V	45VDC	6.3VAC	70VDC	
	V33A	6S8GT	-1.8VDC	-1.5VDC	-1.7VDC	-1.5VDC	6.7VDC	95VDC	6.3VAC	0V	TOP CAP 0V
‡	V33B	6S8GT	-1.8VDC	-1.5VDC	-1.7VDC	-1.7VDC	-1.1VDC	95VDC	6.3VAC	0V	TOP CAP 0V
‡	V34	6AL7GT	-.1VDC	6.3VAC	260VDC	-.4VDC	-.4VDC	-.4VDC	0V	-.1VDC	
**	V35	6J5	0V	0V	140VDC	0V	0V	50VDC	6.3VAC	5.3VDC	
**	V36	7F7	6.3VAC	0V	55VDC	-.5VDC	-.5VDC	110VDC	0V	0V	
	V37	6J5	0V	0V	140VDC	-1.6VDC	-1.2VDC	-1.6VDC	6.3VAC	4.3VDC	
	V38	6V6GT	0V	0V	300VDC	250VDC	-.5VDC	-.5VDC	6.3VAC	12VDC	
	V39	6V6GT	0V	0V	300VDC	250VDC	-.5VDC	-.5VDC	6.3VAC	12VDC	
	V40	6V6GT	0V	0V	300VDC	250VDC	-.4VDC	-.4VDC	6.3VAC	12VDC	
	V41	6V6GT	0V	0V	300VDC	250VDC	-.4VDC	-.4VDC	6.3VAC	12VDC	
	V42	5U4G	0V	340VDC	0V	335VAC	0V	335VAC	0V	340VDC	
	V43	16AP4	♦240VDC	180VDC	PIN 10 380VDC	PIN 11 240VDC	PIN 12 ♦240VDC				

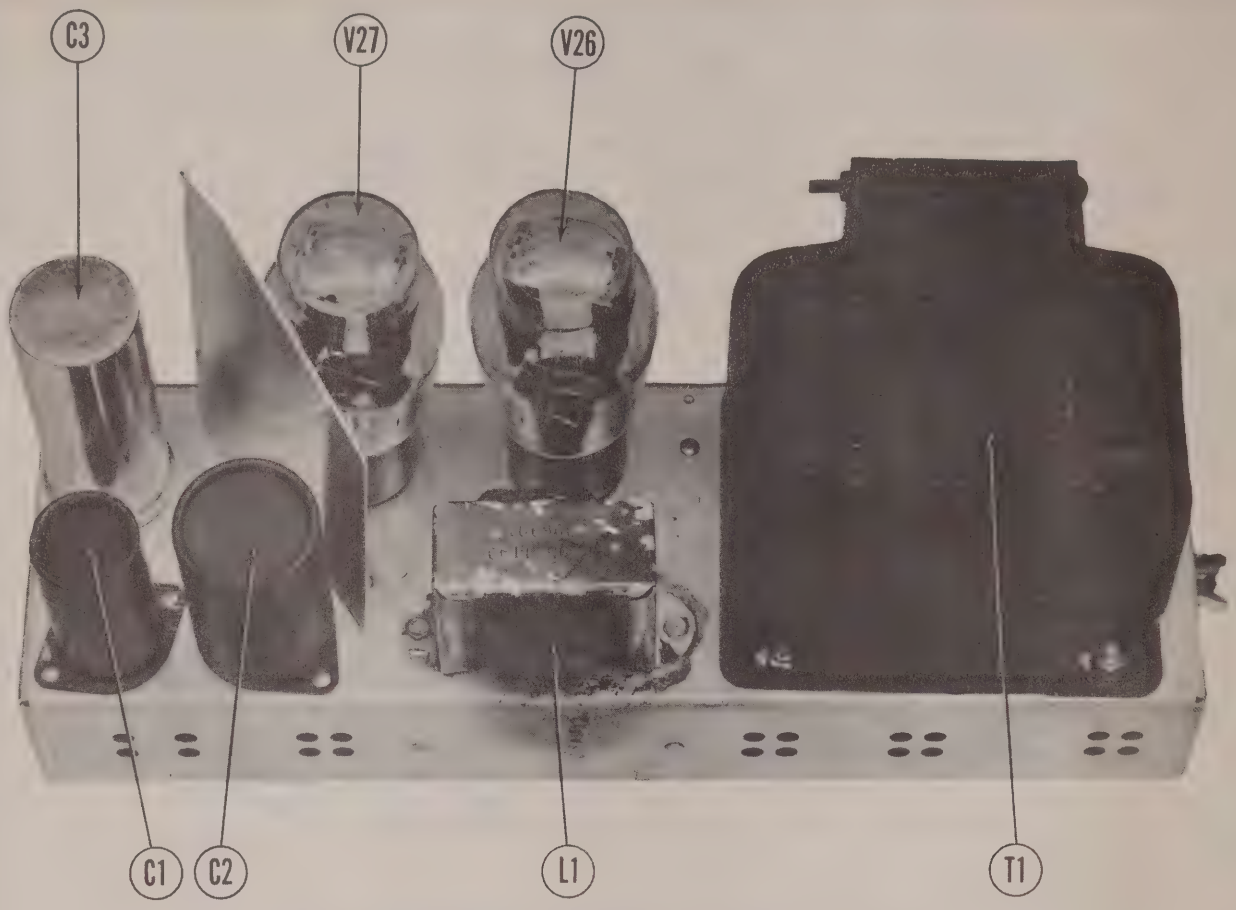
§ Taken with vacuum tube voltmeter.
◓ Measured on channel 10
♦ Measured on channel 4
* Do not measure
♦ 6.3VAC measured across filament.
‡ Taken in FM position.
** Measured in phono position.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

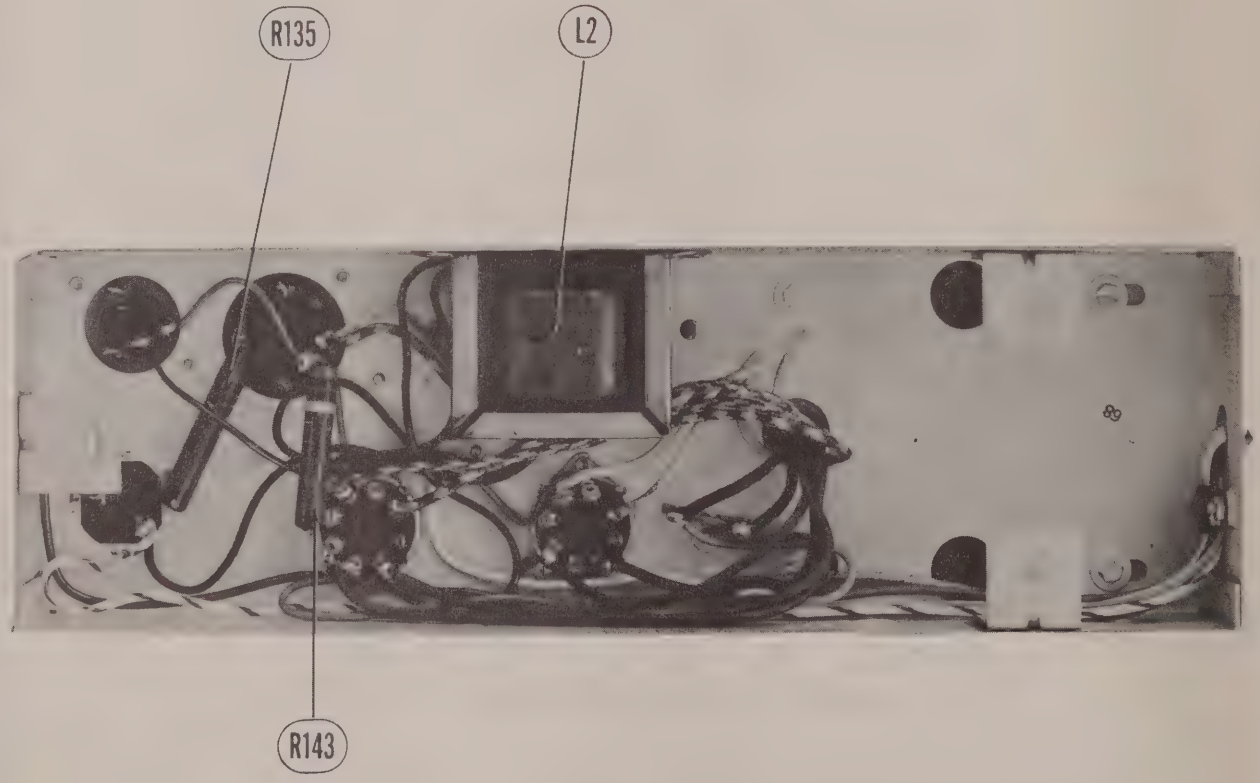




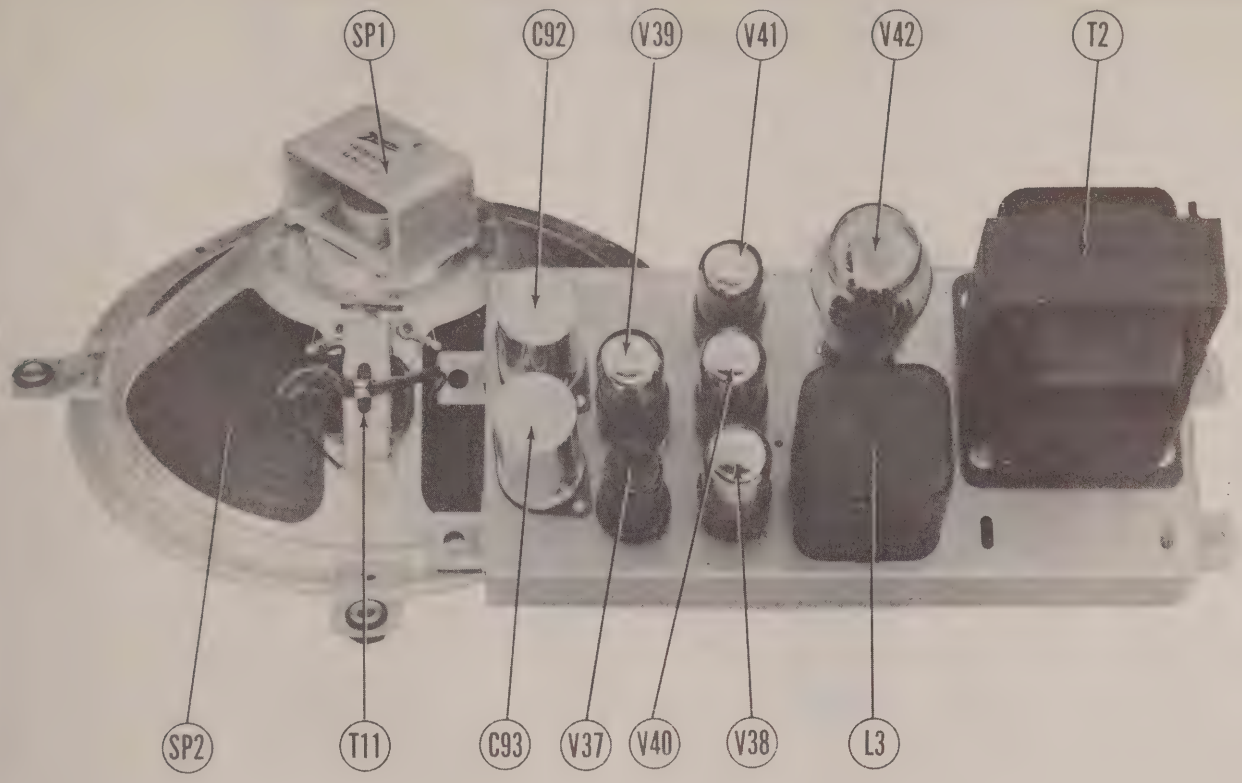
TUBE PLACEMENT CHART



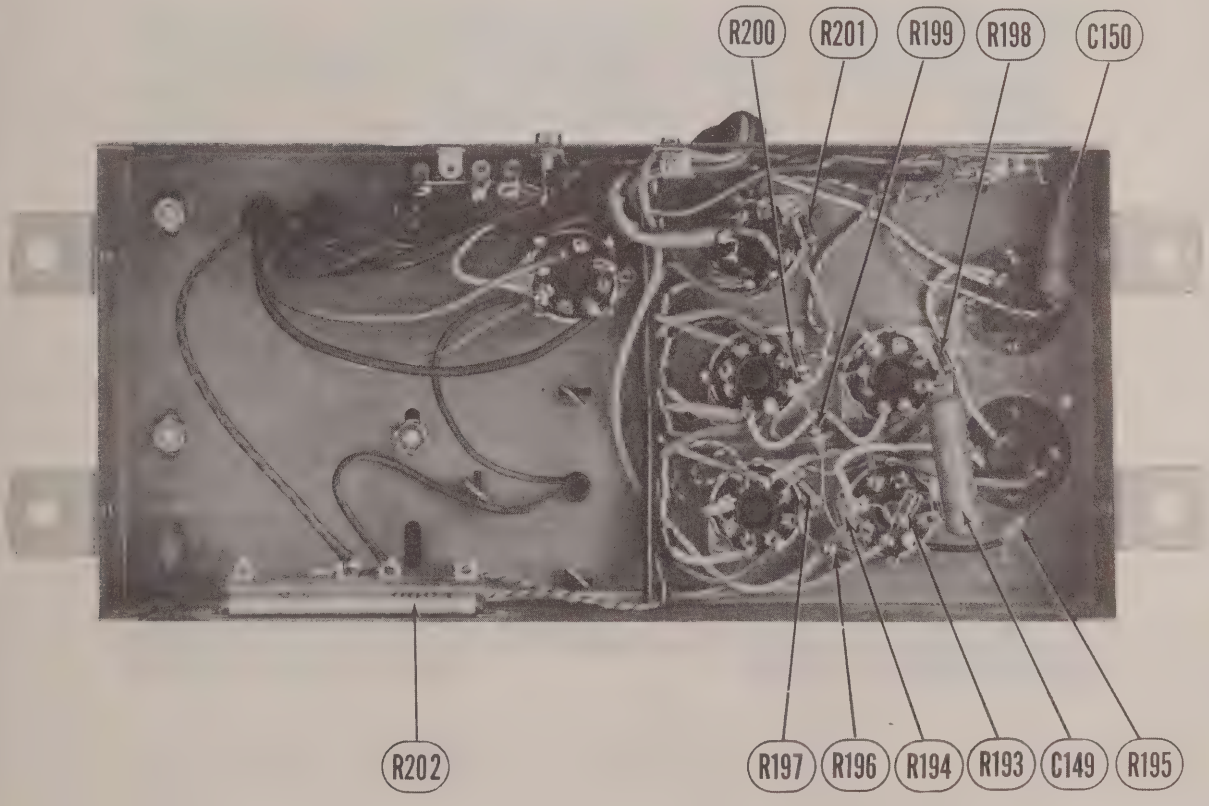
TV POWER SUPPLY-TOP VIEW



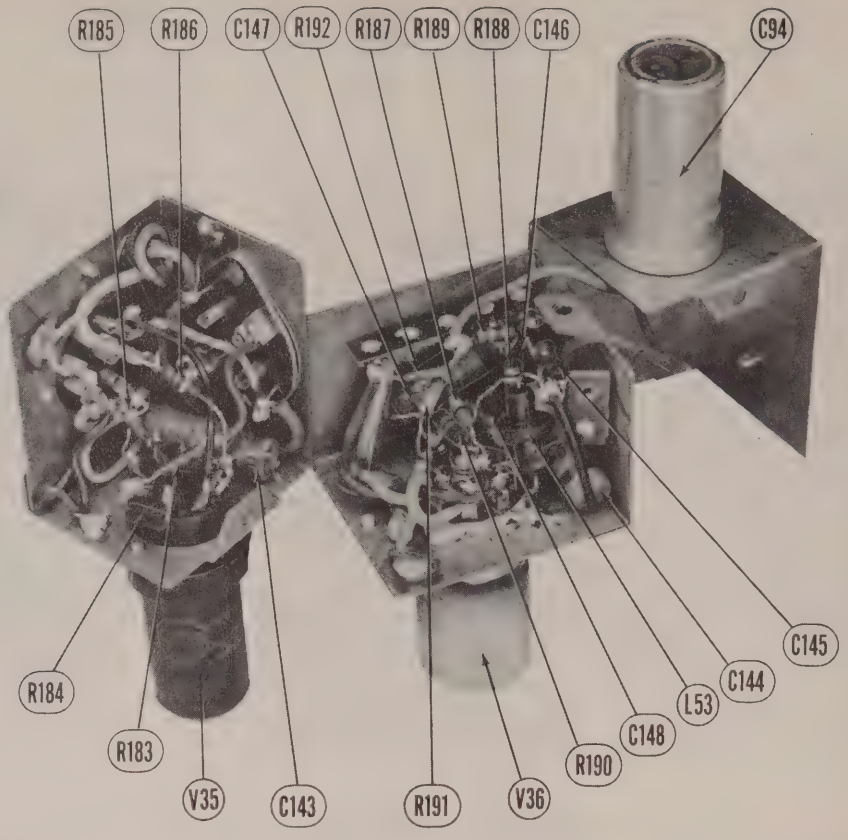
TV POWER SUPPLY-BOTTOM VIEW



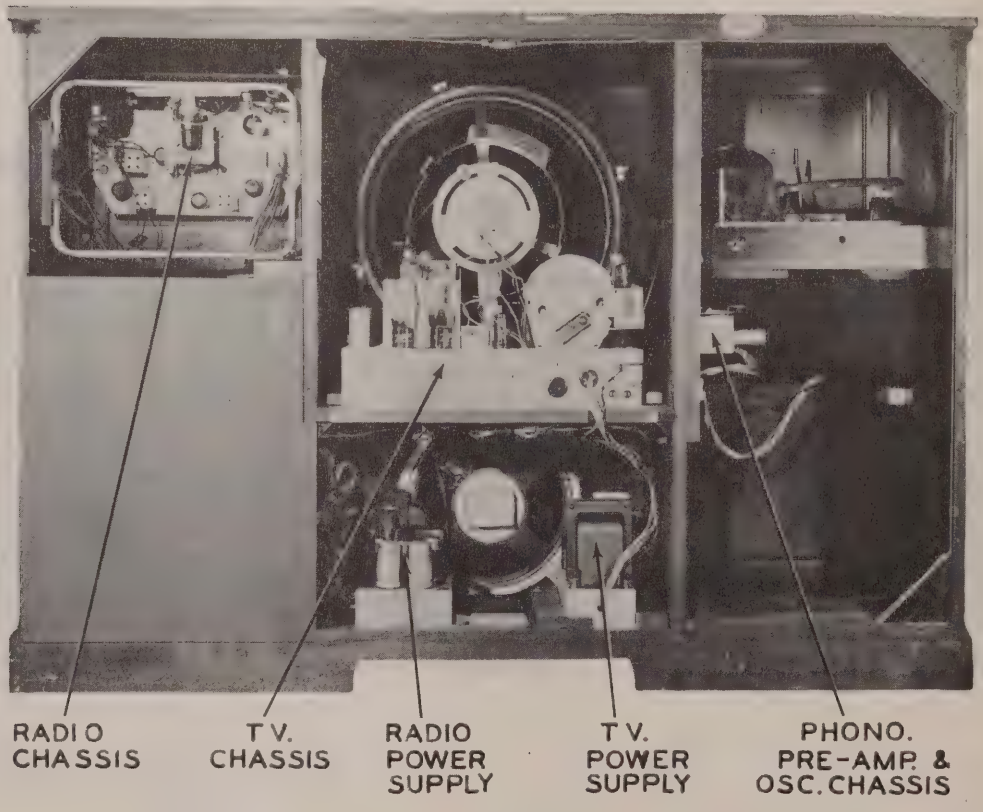
RADIO POWER SUPPLY-TOP VIEW



RADIO POWER SUPPLY-BOTTOM VIEW



PHONO PRE-AMP AND OSCILLATOR SUB-CHASSIS



CABINET-REAR VIEW

HORIZONTAL FREQUENCY ADJUSTMENT

1. Turn the horizontal hold control fully counter clockwise.
2. Adjust Horizontal Frequency adjustment B2 until picture locks in "sync".
3. Turn the horizontal hold fully clockwise. If picture loses "sync", slight readjustment is necessary. Readjustment is also necessary if receiver loses sync when the channel selector switch is turned to another channel and then returned to the original channel.

HORIZONTAL PHASE ADJUSTMENT

Turn adjustment screw B3 and the picture will move to the right or left side of the raster. When B3 is properly adjusted the picture is moved farthest to the right. A broad peak is noted at this point.

AGC ADJUSTMENT

The performance of the AGC circuit is checked and adjusted by applying a known voltage to the video detector test jack "S" and noting the corresponding voltage at the AGC test jack "C". To adjust the AGC circuit to the correct operating point proceed as follows:

1. Turn channel selector switch to a locally unused channel. Disconnect the antenna and short the antenna terminals.
2. Apply -1.5 Volts to test jack "S" (Positive to chassis). This voltage may be obtained from the center arm of a high value potentiometer with the outside terminals across a 3 volt battery.
3. Connect VTVM from test jack "C" to chassis.
4. Adjust B1 until -3.8 Volt reading is obtained on VTVM.
5. Readjust input to test jack "S" to -2 Volts. The corresponding voltage on the VTVM connected to test jack "C" should be -6 to -8 volts.

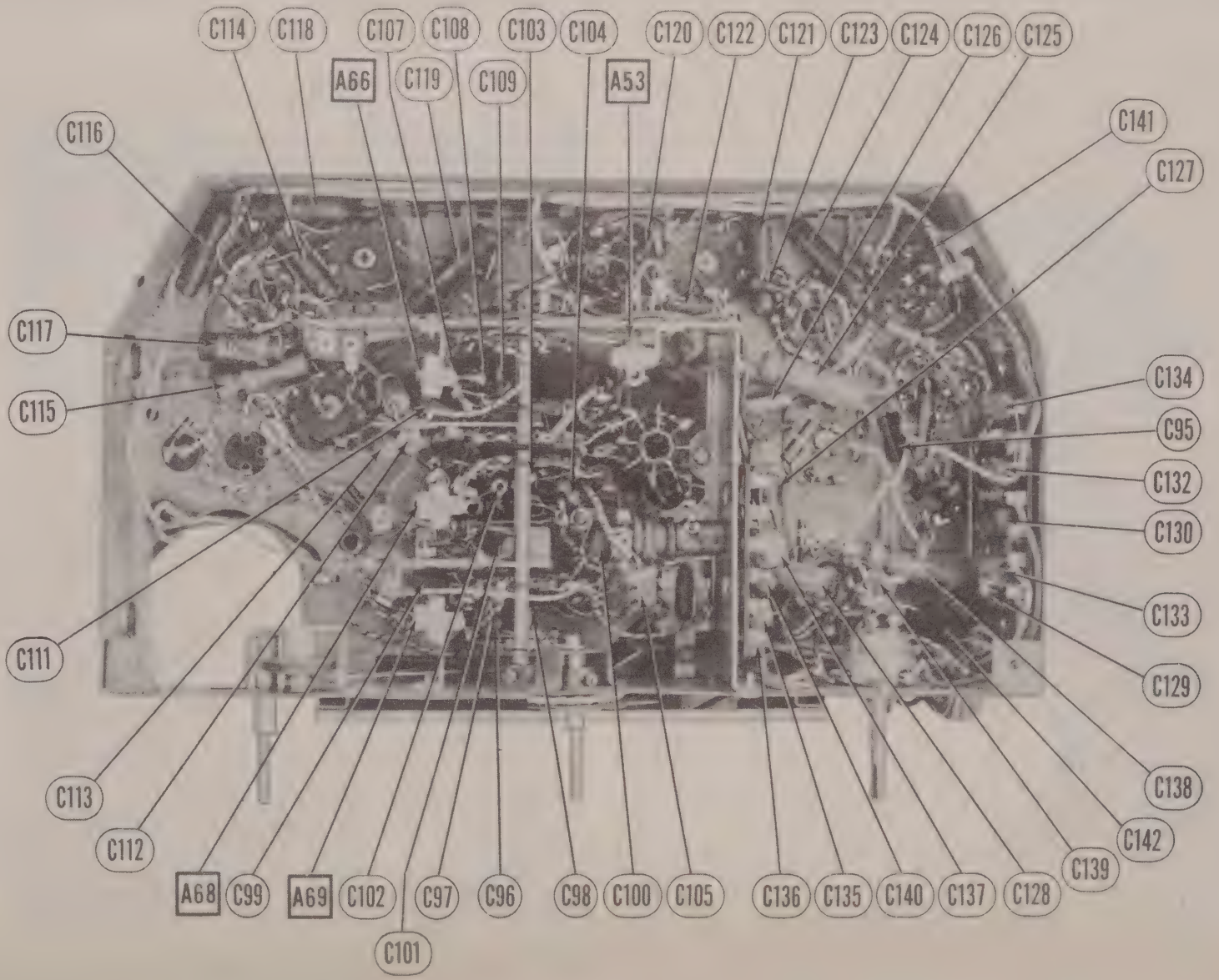
DISASSEMBLY INSTRUCTIONS

TV SECTION

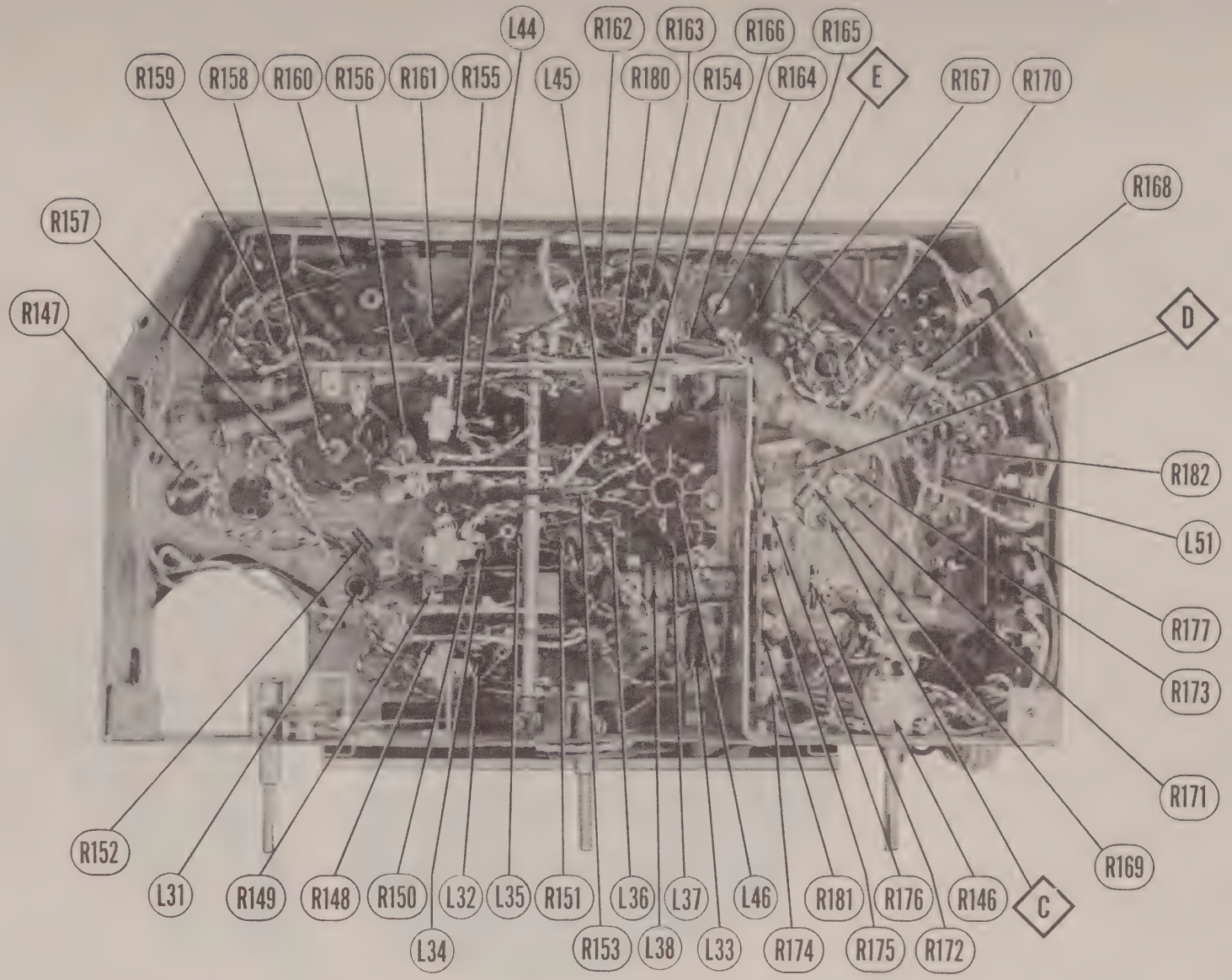
1. Remove 6 push-on type control knobs. (Note: 4 of these knobs are located behind metal plates below large knobs.)
2. Remove 1/4" hex head bolt (right rear) holding 2 ground wires.
3. Remove bayonet plug from rear of TV chassis. (Plug goes to panel lamp in bottom front of cabinet.)
4. Remove plug from rear of TV chassis connecting to power supply chassis.
5. Remove four 3/8" hex head bolts mounting TV chassis.
6. Remove speaker lead jacks at speaker. Feed wires to TV chassis and remove chassis.
7. Remove 2 screws holding small wooden block in front of power supply chassis. Slide out chassis.

RADIO SECTION

1. Remove 3 push-on type control knobs.
2. Push slide latch on top of right push button panel and remove panel.
3. Remove two 1/4" hex head bolts holding push buttons to cabinet.
4. Push slide latch on tone panel. (Tone controls slip thru hole and are removed with chassis).
5. Disconnect loop antenna plug from receiver chassis.
6. Remove 4 screws holding loop antenna hinge to cabinet. Remove loop.
7. Remove FM antenna lead-in wires from receiver chassis.
8. Remove 2 plugs from right side of receiver chassis.
9. Pull out radio door and remove 4 phillips head screws holding receiver chassis. (Use caution as receiver will fall if not supported.) Remove receiver chassis.
10. Remove 3 screws holding pre-amp chassis in radio compartment.
11. Remove plug from pre-amp chassis. Remove pre-amp chassis.
12. Remove 2 screws holding audio chassis. Slide out chassis and remove bayonet plug of panel lamp.
13. Remove speaker plug from audio chassis. Remove audio chassis.
14. Remove four 3/8" hex nuts holding speaker. Remove speaker.
15. Remove 3 screws holding phono oscillator chassis in phono section. Pull plug and remove oscillator chassis.



RADIO CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION



RADIO CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

PUSHBUTTON ADJUSTMENTS

Each pushbuttons covers a portion of the BC band. The frequencies to which each buttons tunes, starting from the top down, are:

B4 & B5 540-940KC
B6 & B7 600-1050KC
B8 & B9 660-1150KC
B10 & B11 740-1300KC
B12 & B13 880-1600KC

To set the pushbuttons proceed as follows:

a) Remove the automatic tuner cover by pulling up on the latch pin and pulling cover away from the escutcheon.

b) Make a list of the stations to which the push buttons are to be adjusted, being sure each station is within the tuning range of the proper button.

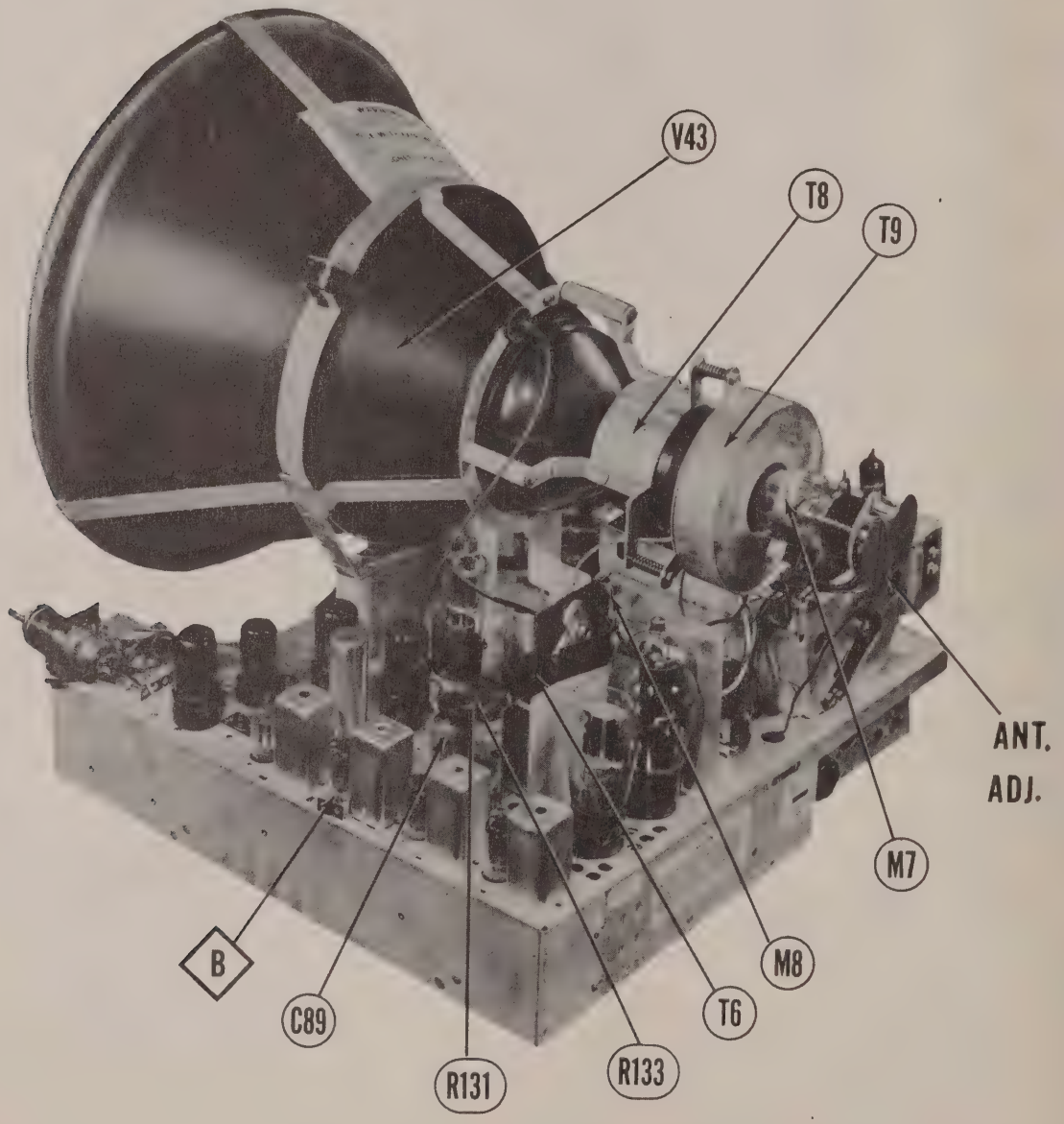
c) Set the band switch to BC and, manually tune in the station the top pushbutton is to receive.

d) Adjust first the screw B4 and then the nut B5 until the desired station is heard.

e) Carefully adjust B4 and B5 until the station is the loudest and clearest.

Repeat the above procedure for each pushbutton.

Check the setting of each pushbutton by switching back to manual, and carefully tuning in the station each button is set to receive. Switch to automatic and push the button being checked. As the selector switch is switched from BC to AUT there should be no change in the signal.



CHASSIS TOP VIEW

RESISTANCE MEASUREMENTS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	3 Meg.	47Ω	.1Ω	0Ω	†1.5KΩ	†23KΩ	47Ω		
V 2	6AG5	4 Meg.	820Ω	.1Ω	0Ω	†1.5KΩ	†150KΩ	820Ω		
V 3	6J6	†♦5KΩ	†◓10KΩ	.1Ω	0Ω	1.5KΩ	47KΩ	0Ω		
V 4	6AU6	2 Meg.	0Ω	.1Ω	0Ω	†1000Ω	†4.5KΩ	82Ω		
V 5	6AU6	2 Meg.	0Ω	.1Ω	0Ω	†6KΩ	†4.5KΩ	82Ω		
V 6	6AH6	.1Ω	0Ω	.1Ω	0Ω	†1.5KΩ	†35KΩ	150Ω		
V 7	12AT7	4KΩ	4KΩ	.1Ω	0Ω	0Ω	†9KΩ	1 Meg.	0Ω	.1Ω
V 8	12AT7	†4.5KΩ	30KΩ	2.2KΩ	.1Ω	.1Ω	†25KΩ	1 Meg.	0Ω	0Ω
V 9	6SL7GT	4KΩ 380Ω	1.5 Meg.	2.2KΩ	900KΩ	†18KΩ	0Ω	.1Ω	0Ω	
V 10	6AC7	0Ω	0Ω	0Ω	1 Meg.	0Ω	†10KΩ	.1Ω	#10KΩ	
V 11	6AU6	.1Ω	0Ω	.1Ω	0Ω	†7KΩ	†7KΩ	68Ω		
V 12	6AU6	.1Ω	0Ω	.1Ω	0Ω	†7KΩ	†7KΩ	68Ω		
V 13	6AU6	100KΩ	0Ω	.1Ω	0Ω	†47KΩ	†47KΩ	0Ω		
V 14	6T8	130KΩ	130KΩ	220KΩ	0Ω	.1Ω	0Ω	0Ω	15 Meg.	†220KΩ
V 15	6V6GT	0Ω	.1Ω	†900Ω	†470Ω	330KΩ	26Ω	0Ω	220Ω	
V 16	6AU6	2.2 Meg.	0Ω	0Ω	.1Ω	†20KΩ	†4KΩ	1000Ω		
V 17	6SH7	0Ω	0Ω	0Ω	1 Meg.	0Ω	†4KΩ	.1Ω	†16KΩ	
V 18	6SN7GT	2.5 Meg.	#3.5Meg. #300KΩ	0Ω	220KΩ	#560KΩ	0Ω	0Ω	.1Ω	
V 19	6V6GT	0Ω	0Ω	#3KΩ	#3KΩ	1.5 Meg.	Inf.	.1Ω	7KΩ 1.5KΩ	
V 20	6AL5	3.3KΩ	470KΩ	0Ω	.1Ω	1 Meg.	0Ω	470KΩ		
V 21	6AC7	0Ω	0Ω	0Ω	1.5 Meg.	10Ω	†28KΩ	.1Ω	#25KΩ	
V 22	6K6GT	Inf.	0Ω	†9KΩ	†14KΩ	80KΩ	#120Ω	.1Ω	17Ω	
V 23	6BG6G	Inf.	.1Ω	150Ω	.1Ω	470KΩ	470KΩ	0Ω	#15KΩ	TOP CAP #15KΩ
V 24	5V4G	Inf.	15KΩ	#65KΩ	#150Ω	Inf.	#150Ω	15KΩ	15KΩ	
V 25	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP #15KΩ
V 26	5U4G	Inf.	10KΩ	Inf.	25Ω	Inf.	24Ω	Inf.	10KΩ	
V 27	5U4G	Inf.	25KΩ	Inf.	27Ω	6KΩ	29Ω	6KΩ	25KΩ	
V 28	6BA6	3 Meg.	0Ω	0Ω	.1Ω	††6KΩ	††33KΩ	0Ω		
V29A	6SB7Y	0Ω	.1Ω	††2KΩ	††20KΩ	33KΩ	0Ω	0Ω	5Ω	
‡ V29B	6SB7Y	0Ω	.1Ω	††2KΩ	††20KΩ	33KΩ	0Ω	0Ω	0Ω	
V30	6SG7	0Ω	.1Ω	0Ω	2 Meg.	0Ω	††70KΩ	0Ω	††2.2KΩ	
V31	7W7	0Ω	††3.2KΩ	††120KΩ	0Ω	0Ω	2KΩ	0Ω	.1Ω	
V32	6SH7	0Ω	0Ω	0Ω	50KΩ	0Ω	††60KΩ	.1Ω	††100KΩ	
V33A	6S8GT	250KΩ	33Ω	100KΩ	100KΩ	200KΩ	††320KΩ	.1Ω	0Ω	TOP CAP 15 Meg.
‡ V33B	6S8GT	250KΩ	33Ω	100KΩ	100KΩ	200KΩ	††320KΩ	.1Ω	0Ω	TOP CAP 15 Meg.
‡ V34	6AL7GT	3.3KΩ	.1Ω	††1000Ω	30Ω	30Ω	3 Meg.	0Ω	3.3KΩ	
** V35	6J5	0Ω	0Ω	††50KΩ	Inf.	1 Meg.	1 Meg.	.1Ω	2.2KΩ	
** V36	7F7	1Ω	0Ω	††470KΩ	15 Meg.	1 Meg.	††100KΩ	.2Ω	0Ω	
V37	6J5	0Ω	0Ω	††47KΩ	33Ω	33KΩ	33Ω	.1Ω	2.2KΩ	
V38	6V6GT	0Ω	0Ω	††240Ω	††1.4KΩ	220KΩ	220KΩ	.1Ω	110Ω	
V39	6V6GT	0Ω	0Ω	††240Ω	††1.4KΩ	220KΩ	220KΩ	.1Ω	110Ω	
V40	6V6GT	0Ω	0Ω	††250Ω	††1.4KΩ	215KΩ	215KΩ	.1Ω	110Ω	
V41	6V6GT	0Ω	0Ω	††250Ω	††1.4KΩ	215KΩ	215KΩ	.1Ω	110Ω	
V42	5U4G	Inf.	35KΩ	Inf.	80Ω	Inf.	76Ω	Inf.	35KΩ	
V43	16AP4	80KΩ	#10KΩ	PIN 10 #150Ω	PIN 11 120KΩ	PIN 12 80KΩ				

** Measured in phono position.
† Measured from pin 8 of V26.
◓ Measured on channel 10.
♦ Measured on channel 4.
Measured from pin 8 of V27.
†† Measured from pin 8 of V42
‡ Taken in FM position.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.